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NEW
AMERICAN CYCLOPÆDIA.

VOL. XIII.

PARR—REDWITZ.

THE NEW

AMERICAN CYCLOPÆDIA:

A

Popular Dictionary

OF

GENERAL KNOWLEDGE.

EDITED BY

GEORGE RIPLEY AND CHARLES A. DANA.

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THE
NEW AMERICAN CYCLOPÆDIA.

PARR, Samuel, LL.D., an English scholar, clergyman, and author, born at Harrow-on-the-Hill, Jan. 15, 1747, died March 6, 1825. He was the son of a surgeon and apothecary. He early manifested a taste for learning, and when, at the age of 15, he was removed from school and placed at his father's business, he devoted his leisure time to the study of Greek and Latin with such assiduity that in 1765 his father reluctantly consented to his entering the university of Cambridge. The death of his parent obliged him to accept in 1767 the first assistant mastership of Harrow school, where he remained 5 years. Having been rejected by the governors as a candidate for the vacant head mastership in 1771, he taught a school on his own account at Stanmore, and in 1777 became master of the school at Colchester, where he was ordained priest, receiving the curacies of Hythe and Trinity church. In the following year he was appointed master of Norwich school. Two sermons "On the Truth and Usefulness of Christianity" and "On the Education of the Poor" (1780) appeared during his residence here, and the latter served to prepare the way for his much admired "Discourse on Education, and on the Plans pursued in Charity Schools" (1785). In the mean time the university of Cambridge had granted him the degree of LL.D. (1781), and Bishop Lowth had appointed him a prebendary of St. Paul's. In 1786 he removed to Hatton in Warwickshire, where he held a perpetual curacy, and here he passed the remainder of his life, engaged in literary pursuits, the care of his parish, and the instruction of children. His personal unpopularity with the members of his own profession and the dispensers of government patronage prevented his rising to those dignities in the church to which his learning entitled him. He was vain, arrogant, and quarrelsome, a violent whig partisan, and both unjust and inconsistent in many of his political opinions. He advocated the repeal of measures against the Roman Catholics and Unitarians, but could not tolerate Methodists. In his controversial writings he was frequently unfair and untruthful, but he possessed great natural benevolence, and is said to have surpassed in conversational powers all his contemporaries except Dr. Johnson. In 1787 he published an edition of *Bellendenus de Statu*, with a preface in which he eulogized Burke, Fox, and Lord North, but attacked other contemporary statesmen with great virulence. It is esteemed one of the most successful modern imitations of Ciceronian Latin. His preface to an edition of "Tracts by Warburton and a Warburtonian, not admitted into the Collection of their respective Works" (1789) is remarkable for its polished style; but the work was undertaken in order to annoy Bishop Hurd, the editor of Warburton. His other writings comprise a controversy with Dr. White, whom he accused of plagiarism in his "Bampton Lectures" (1790), papers connected with the Birmingham riots of 1791, a controversy with Dr. Charles Combe in 1795, and one with Godwin and others occasioned by Parr's Spital sermon in 1800, and "Characters of the late Charles James Fox" (1809), consisting partly of original and partly of selected matter. He left a considerable number of historical, critical, and metaphysical papers in manuscript. An edition of his works, with a memoir of his life and writings and selections from his correspondence, was published by John Johnstone, D.D. (8 vols., London, 1828).

PARR, Thomas, commonly known as Old Parr, an Englishman celebrated on account of his great age, born in Winnington, Shropshire, in 1483, died in London, Nov. 15, 1635. He was the son of poor parents, and after his father's decease continued his occupation of husbandry. He was first married at the age of 80, and begot two children; and after the death of his wife, he married again when about 120 years old. According to a current story, he was engaged in a love intrigue when about 105 years old, and was compelled to do penance for the crime by standing in a sheet in Alderbury church. When a little over 152 years old, he was taken to London by Thomas, earl of Arundel; but dying soon after, he was buried in Westminster abbey. Almost all that is authentically known in regard to him is contained in a pamphlet published in 1635 by John Taylor, under the title of "The Olde, Olde, Very Olde Man; or, the Age and Long

Life of Thomas Parr, the Sonne of John Parr, of Winnington, in the Parish of Alderbury, in the County of Salopp, who was born in the reign of King Edward the IVth, and is now living in the Strand, being aged 152 years and odd monthes. His manner of life and conversation in so long a pilgrimage; his marriages, and his bringing up to London about the end of September last, 1635."

PARRHASIUS, a Greek painter, born in Ephesus, flourished about 400 B. C. He was the son and pupil of Evenor, and, although belonging to the Ionian school of art, passed the greater part of his life in Athens, of which city he was made a citizen. Quintilian calls him the legislator of his art, from the fact that he established certain canons of proportion for the human figure which were adopted by succeeding artists; and Pliny says: "He first gave to painting true proportion, the minute details of the countenance, the elegance of the hair, the beauty of the face, and by the confession of the artists themselves obtained the palm in his drawing of the extremities." He was arrogant and insolent in manner, and in epigrams inscribed on his own productions called himself 'Αβροδίαιτος, the elegant, claiming a divine descent, and announcing that in his works the art of painting had reached its highest excellence. His most celebrated work, according to Pliny, was an allegorical representation of the Athenian people, in which every quality, good or bad, ascribed to the Athenians, found its expression. Among other famous works by him were a Theseus, of which Euphranor remarked that it had fed upon roses, and his own Theseus upon beef; "Ulysses feigning Insanity;" a Meleager, Hercules, &c. He also painted pictures of a gross and licentious character, two of which, the "Archigallus" and the "Meleager and Atalanta," were so highly prized by the emperor Tiberius that he caused them to be hung in his own chamber. Two well known contests in which he engaged with contemporary painters are recorded. In the first, when conquered by Timanthes, the subject being the combat of Ulysses and Ajax for the arms of Achilles, he observed that he cared little for his own defeat, but felt pity for Ajax in being a second time overcome by an unworthy rival. In the second contest, which was with the painter Zeuxis, the latter executed a bunch of grapes so naturally that the birds came and pecked at the fruit. He thereupon requested Parrhasius to draw aside a curtain which apparently concealed his own picture; but as the curtain proved to be the picture itself, the victory was conceded by Zeuxis to his rival, who by deceiving men had gone further than himself in the art of imitation. The story told by Seneca, that Parrhasius, when painting a "Prometheus Chained," put an Olynthian captive to the torture, in order to obtain from him the proper expression of bodily suffering, has been proved to be utterly unfounded.

PARROT, the general name of the *psittacidæ*, a family of scansorial birds, remarkable for the elegance of their form, the brilliancy of their plumage, and their docility and power of imitating the human voice. They have a large strong bill, much arched, with acute tip, and the lower mandible notched at the end; the upper mandible is movably articulated to the frontal bones, enabling them to seize larger objects than other birds of their size; the tongue is thick and fleshy, the wings and tail generally long, tarsi short and robust, and the strong toes directed 2 before and 2 behind, the former united at the base by a narrow membrane. These are the typical climbers, but are slow and generally awkward on the ground; they use both bill and claws in climbing, and while feeding use one foot to hold their food; though rather sedentary, most of them are good fliers; the neck is short, and has usually 12 vertebræ; the sternum is long and narrow, with generally an oval aperture on its inferior margin on each side; the structure of the tongue and the complicated lower larynx enable them to articulate with great distinctness. They are confined to the warm parts of America, Asia, Africa, and Australia, and generally to the southern hemisphere; their food consists of soft pulpy fruits, especially such as have hard kernels or seeds; they are usually seen in large flocks, active in the morning and evening, noisy and quarrelsome, destructive to vegetation in their wild state, and very mischievous in captivity; they are monogamous, and build their nests generally in hollow trees. This is a very extensive family, numbering about 300 species, and divided by Gray into the sub-families of *pezoporinæ*, *arainæ*, *lorinæ*, *cacatuinæ*, and *psittacinæ;* the first 4 are described respectively under the titles Paroquet, Macaw, Lory, and Cockatoo, leaving for this article only the *psittacinæ*, and the genus *conurus* of the macaws. Some of the parrots present raptorial characters in the form of the bill, and especially in its soft skin or cere. Bonaparte makes of them a distinct order, placing them at the head of his system, separated from the typical *scansores* by the rapacious birds; for the connecting links between the families see Owl, and Owl Parrot.—The only well ascertained species within the United States is the Carolina parrot (*conurus Carolinensis*, Kuhl); in this the length is about 14 inches, and the alar extent 22; the bill is short, bulging, and very strong; the head is large, the neck robust, and the body and tail elongated, the latter wedge-shaped; the bill is white and the iris hazel; general color green with bluish reflections, lightest below; fore part of head and cheeks bright red, extending over and behind the eye, the rest of the head and neck gamboge yellow; edge of wing yellow tinged with red; wings and their coverts varied with bluish green, greenish yellow, and brownish red; 2 middle tail feathers deep green, the others with the inner webs brownish red; thighs yellow.

This species has been seen as far north as Lake Ontario, though now it is chiefly confined to the southern and south-western states, and as far as the Missouri to the west. They are very fond of the seeds of the cockle bur, and eat almost any kind of fruit and grain, from their immense flocks committing great havoc in the garden, field, and orchard, destroying in search of seeds far more than they consume; they are killed in large numbers by the enraged farmers, who consider their flesh a delicacy. The flight is rapid and direct, with great inclinations of the body and incessant noisy cries; they generally alight close together on the trees bearing the desired fruit; they are savage when wounded, but are easily tamed by immersion in water; they are destructive in captivity, and incapable of articulating words. They are fond of sand and saline earths. Many females deposit their eggs in the same hollow of a tree, each one laying 2 or 3. Several other parrots are found in Mexico and Central America.—To the subfamily of *psittacinæ* belong the parrots best known in the domesticated condition, especially the gray and green parrots so common as pets; in this group the head is without crest, the margins of the bill are dentated or festooned, the wings pointed, and the tail short and square. In the old genus *psittacus* (Linn.) the bill is large, rather compressed, with biangular culmen much arched to the tip, near which the lateral margin is deeply notched, the under mandible much sinuated and the anterior edge sharp; wings generally reaching to the end of the tail, with 2d and 3d quills equal and longest. There are more than 40 species found in the humid forests of Africa and South America; collecting at night in immense flocks, they leave their roosting places early in search of food, which consists chiefly of pulpy fruits and seeds, after which they bathe and retire to thick-leaved trees during the heat of the day, going in search of food again at night; they migrate in large flocks to warmer regions on the approach of the rainy season, rising to a great height and uttering the most discordant screams; the young are fed with the disgorged half masticated food of the parents. The gray parrot (*P. erythacus*, Linn.) is the most remarkable for its docility and power of articulating words, and is the one about which so many wonderful tales are extant; it is about 12 inches long, of an ash-gray color, with a bright scarlet tail, yellowish white irides, and grayish feet and toes. It is a native of W. Africa, whence it has been imported from a very early period; its habits are not very well known in the wild state, but in captivity it feeds on bread and milk, nuts, and even meat, holding its food with one foot, and reducing it to small pieces by the bill and cutters on the palate; it may reach the age of 70 and even 90 years. They breed readily in captivity. Anecdotes of these parrots might fill a large volume; it will be sufficient to say here that many of the recorded apposite speeches made by them are the result of the fortunate repetition of previously acquired sentences, and are not new words dictated by intelligence or any consciousness of their applicability. Large sums have been paid for well taught specimens, and a cardinal is said to have given 100 golden crowns for one which could repeat the Apostles' Creed; another is said to have served acceptably as chaplain of a vessel, reciting the prayers to the sailors. In the genus *chrysotis* (Swains.), of tropical South America, the bill is smaller but strongly dentated; the wings reach to the middle of the tail, which is broad and rounded. The green parrot (*C. Amazonicus*, Gmel.) is very often taken to the United States and Europe on account of its great colloquial powers; it is 12 inches long, the bill orange yellow, as well as the cheeks and chin; the general color is shining green, with a bluish purple band over the forehead, and the feathers of the hind neck edged with black; it inhabits the country watered by the river Amazon, where it often does great mischief to the plantations. The festive parrot (*C. festivus*, Linn.), a native of the same forests, is 15 or 16 inches long, of a general green color, with a narrow red frontal band and eye streak, blue above and behind the eyes, lower back and rump vermilion, and the greater quills with blue outer webs and the inner greenish black; it is docile, easily tamed, and learns readily to pronounce words and sentences. The last two species are those most commonly brought from South America; there are several others described. In the genus *psittacula* (Briss.) the size is generally small; the bill is rather large with the lateral margins festooned; the pointed wings extend to the end of the tail, which is short and even; there are about 60 species described, in South America, Africa, and Asia and its archipelago; they are rapid fliers and expert climbers, often hanging head downward in their search for fruits; while feeding they utter a shrill chirp, like that of a large grasshopper; when sleeping they generally suspend themselves by one or both feet, head downward. Here belong the beautiful little "love birds," the genus *agapornis* of Selby. Swindern's love bird (*P. Swinderniana*, Kuhl) is a native of S. Africa; it is about 6 inches long, with a black strong bill whose upper mandible is notched; the head and nape are bright green, bounded by a black nuchal collar; neck and breast yellowish green, mantle and wings green, lower back and upper tail coverts azure blue; the short and nearly even tail has a median bar of vermilion edged with black and the tip green. These parrots are remarkable for their attachment to each other. Other genera are *tanygnathus* (Wagl.), of the Moluccas and New Guinea, having a very large and swollen bill without dentations, a very long, broad, and wedge-shaped tail, short tarsi, and long slender toes; and *nasiterna* (Wagl.), which is a very small New Guinea genus, having a short elevated bill, and the apex of each feather of the short rounded tail prolonged into an acute point; the *N. pygmæa* (Wagl.) is the smallest of the parrot family.

PARROT, Johann Jakob Friedrich Wilhelm, a German natural philosopher, born in Carlsruhe, Oct. 14, 1792, died Jan. 15, 1841. In 1811 and 1812 he travelled in company with Engelhardt over southern Russia and the Caucasus, and on his return published an account of his travels under the title of "Travels in the Crimea and Caucasus" (2 vols., Berlin, 1815–'18). In 1821 he was appointed professor of physiology, pathology, and semeiology in the university of Dorpat, travelled in 1824 in the Pyrénées, and in 1829 was the first to make a successful ascent of Mount Ararat. He wrote "Journey to Ararat" (2 vols., Berlin, 1834; English translation by Cooley, London and New York, 1845); a treatise on "Gasometry" (Dorpat, 1814); and "Views in regard to Universal Pathology" (Riga, 1821).

PARROT FISH, the common name of the numerous cyclolabroid fishes of the genus *scarus* (Forsk.); the name is derived from the beak-like form of their jaws; they also present the same brilliancy and variety of colors as do the parrots among birds. The form is oblong and stout, with the lateral line branching and interrupted under the end of the dorsal fin. The jaws are prominent, convex, each divided into halves by a median suture; the teeth are incorporated with the bone, arranged in an imbricated manner in crowded quincunxes, the oldest forming the cutting border, and succeeded by the lower ranks as the former are worn away; their surface is generally smooth and polished; the pharyngeal teeth consist of trenchant transverse vertical plates, two above and one below, presenting when worn narrow ellipses of dentine surrounded by enamel; the lips are simple and fleshy, in some species leaving the teeth exposed. The body is covered with large scales, as far as the gill covers and cheeks, there being from 21 to 25 in a longitudinal line and 8 in a vertical one at the region of the pectorals; those at the base of the caudal fin are large and embrace a considerable portion of its rays; there is a single conical dorsal, with 9 spiny and 10 articulated rays; the anal has 2 spiny and 8 articulated rays. The muzzle is obtuse, and the profile sometimes rather high; there are no stomachal nor pancreatic cæca. There are about 100 species described, living principally on the coral reefs of the West and East Indian archipelagos, about one quarter dwelling around the Molucca and Sunda islands. The best known is the parrot fish of the Mediterranean (*S. Cretensis*, Rond.), of a red or blue color according to season, highly esteemed by the ancients; it is about 15 inches long, of a general purplish color, roseous below, and violet brown on the back; the pectorals orange, ventrals with transverse lines of violet, and dorsal violet gray with golden spots and bands. There is more said of this fish in the ancient writers than of any other; in Pliny's time it was ranked as the first of fishes, and large sums were expended to stock the Italian waters with it from the sea between Crete and Asia Minor. By the ancients it was believed to have a voice, to sleep at night (alone of fishes), to be very ardent in the pursuit of the female, to release its companions and other fishes from nets, and to have the power of ruminating; the last belief naturally arose from the backward and forward movements of the jaws rendered possible by the mode of articulation, and necessary for the complete mastication of the sea weeds upon which it principally feeds. Its flesh is tender, sweet, and easy of digestion, and the intestines and their contents were highly relished; the modern Greeks call it *scaro*, and consider it a fish of exquisite flavor, eating it with a sauce made of its liver and intestines, as the moderns eat plover and woodcock; its liver entered into the composition of the famous dish called "the shield of Minerva," with the brains of the peacock and pheasant, flamingoes' tongues, and the milt of the muræna eel. The red parrot fish of the West Indies (*S. Abilgaardii*, Val.), about 16 inches long, is a handsome species. The great parrot fish (*S. guacamaia*, Val.), from the same locality, attains a length of 2¼ or 3 feet, and a weight of 80 lbs.; the colors are red, blue, and green. Many other beautiful species are described from North America in Dr. Storer's "Synopsis," and the whole genus is treated at length in vol. xiv. of the *Histoire naturelle des poissons* by Cuvier and Valenciennes.

PARRY, Sir William Edward, an English navigator, born in Bath, Dec. 10, 1790, died at Ems, Germany, July 8, 1855. He was the son of a physician, and was intended for his father's profession; but after he had received a good education at the grammar school of his native place, a relative induced him to enter the navy. In June, 1803, he was appointed a first class volunteer on board the Ville de Paris, 110, the flag ship of Admiral Cornwallis, and remained in this vessel until 1806, when he was rated as midshipman on the Tribune frigate. Having been transferred to the Vanguard, 74, of the Baltic fleet, he was several times in action with the Danes, and in one engagement was intrusted with the command of one of his ship's boats. In 1810 he obtained his commission as lieutenant, and sailed in the Alexandria frigate to the polar seas about the North cape, where he corrected the admiralty charts of those waters. After the outbreak of war between Great Britain and the United States, he was sent to Halifax (1813) to join the La Hogue, 74, with whose boats in the spring of 1814 he ascended the Connecticut river about 20 m., and destroyed 27 privateers and other vessels with the loss of only 2 men. He remained on the North American station until 1817, when, hearing that two expeditions, the one under Buchan and Franklin and the other under Capt. Ross, were about to be sent out to the north polar regions, he solicited employment, and was placed in command of the Alexander under the orders of Ross in the Isabella. They left England in April, 1818, and proceeded to Lancaster sound, which they navigated for about 60 m., when Ross, imagining that he saw the way closed before them by a range of mountains, gave orders to return. Parry freely expressed his conviction that the range of mountains was an optical illusion; and as the public generally coincided in this opinion, it was determined in the spring of 1819 to equip a fresh expedition under his command. With the Hecla, 375 tons, and the Griper gun brig, 180 tons, Lieut. Liddon, he reached Lancaster sound July 30, and sailed through it. He explored and named Barrow straits, Prince Regent inlet, and Wellington channel, and, entering the water which has since been called Parry sound, reached on Sept. 4 long. 110° W., thereby earning a reward of £5,000 offered by parliament to the first ship's company which should attain that meridian. He wintered at Melville island, and his expedients to preserve the health and spirits of his crews during the long arctic night were scarcely less deserving of mention than his achievements as a discoverer. Exercise was rigorously enforced, all possible precautions were taken against scurvy, and a newspaper and theatre were provided as amusements. On Aug. 2, 1820, after being frozen in for 10 months, the ships were released; but the state of the ice was such as to preclude the hope of further progress westward, and Parry accordingly returned to England, where he was welcomed with the utmost enthusiasm. He was promoted to the rank of commander, presented with the freedom of Bath and Norwich, and elected a member of the royal society, and the narrative of his adventures was published by order of the admiralty. The results of his voyage, beside the establishment of the navigability of Lancaster sound and the existence of a polar sea to the north of America, were extremely important to the science of magnetism, no observations having ever before been made so near the magnetic pole. The great problem however of the north-west passage was still unsolved, and in May, 1821, Parry sailed again with the Fury, accompanied by Capt. Lyon in the Hecla. He passed through Hudson's strait and Fox's channel, discovered and named the Duke of York's bay on the N. shore of Southampton island, and passing through Frozen strait reached Repulse bay. After a season of fruitless exploration along these waters lying immediately N. of Hudson's bay, his ships were frozen in at Winter island, Oct. 8, and were not released again until July 2. He now sailed up Fox channel to the mouth of the strait separating Melville peninsula from Cockburn island, and named it Fury and Hecla strait. As it was frozen across, he made a journey on foot to the narrowest part of the strait, whence he could see in the W. an open expanse of water which he thought was the polar sea, but which is now known as the gulf of Boothia, at the S. extremity of Prince Regent inlet. On Aug. 26 they were again imprisoned by the ice, but they performed during the winter several land journeys, sufficient to convince them that any attempt to reach the polar sea through Hudson's strait was hopeless. The appearance of scurvy among his men induced him in the spring to return home, and on Oct. 10, 1823, he arrived at Brassa sound, Shetland. During his absence he had been promoted to the rank of post-captain (Nov. 8, 1821); and in Dec. 1823, he was appointed acting hydrographer to the admiralty. His "Journal of a Second Voyage for the Discovery of a North-West Passage" was published by the admiralty in 1824. The results of these voyages, however imperfect, were sufficient to encourage further search, and the Hecla and Fury were consequently refitted as speedily as possible. In May, 1824, Capt. Parry sailed again in the Hecla, with Capt. Hoppner in the Fury under his orders. His plan was to pass through Prince Regent inlet, but winter overtook him almost at the entrance of that channel; and soon after the ice broke up, July 20, 1825, his vessels were caught in the drift and carried down the inlet. On Aug. 21 the Fury was driven ashore, and so badly damaged that she had to be abandoned. Her crew and stores were transferred to the Hecla, and, deeming it impossible to continue the voyage under such circumstances, Capt. Parry returned to England, having accomplished little or nothing. His "Journal of a Third Voyage for the Discovery of a North-West Passage" appeared in 1826. He now turned his attention to a plan originally proposed by Scoresby for reaching the pole in boats which could be fitted to sledges and floated or dragged as occasion might offer; and having improved somewhat upon the original design and obtained the sanction of the admiralty, he set sail in the Hecla, March 27, 1827, for Spitzbergen. Here the vessel was left in harbor with a part of the crew, while the remainder, led by Capt. Parry and Lieut. James C. Ross, set out for the pole in two boats, June 22. These boats were framed of ash and hickory, covered with water-proof canvas, over which were successive planks of fir and oak, with a sheet of stout felt interposed. They were flat-bottomed inside, and had runners so that they could be used as sledges. The adventurers sailed through an open sea for about 80 m., and then found, not as they had expected a solid plain of ice, but a surface half covered with water, on which walking and sailing were almost equally difficult. They entered this ice June 24, and after 5 nights of laborious travelling (for they travelled only by night to avoid snow blindness) had advanced only 10 miles. After reaching harder ice their progress became more rapid, but on July 19 a north wind sprang up which proved a more formidable obstacle than any they had yet experienced. It was found that the ice moved southward while they were travelling toward the north, and on the 24th they were 4 m. S. of the position occupied on the 22d. It was evidently impossible to proceed further, and they began to retrace their steps, having reached as far N. as lat. 82° 45', the nearest point to the pole that had been reached by any expedition, and travelled in a direct line 172 m. from the ship, to accomplish which distance they had been obliged to pass over 668 m. of surface. They reached the Hecla after an absence of 61 days, and at the end of September arrived in England, where Capt. Parry published his "Narrative of an Attempt to reach the North Pole in Boats fitted for the Purpose" (1827), and resumed his duties as hydrographer to the admiralty. On April 29, 1829, he was knighted by George IV., Sir John Franklin receiving the same honor at the same time. Both these distinguished navigators also received from the university of Oxford the degree of D.C.L. Parry now received the appointment of commissioner of the Australian agricultural company, the mismanagement and neglect of whose agents had reduced their settlements to the condition of "a moral wilderness." He took ship July 20, 1829, and passed 5 years at Port Stephens, about 90 m. from Sydney. Returning to England in 1835, he received from the company a service of plate "in testimony of the high sense entertained of the benefits conferred by him on the colony during his residence there;" was appointed assistant commissioner of poor law for the county of Norfolk, an office which he was obliged to resign on account of his health at the end of 18 months; was employed by the admiralty in 1837 to organize the packet service between Liverpool, Holyhead, and Dublin; and in April of the same year received the newly created office of comptroller of steam machinery for the royal navy. During his term of office the use of steam in the navy, which had already been tried to a considerable extent, became almost universal, and the introduction of the screw propeller was in great measure owing to his persevering advocacy. In 1841, at the request of Sir Robert Peel, he drew up a report on the state of the Caledonian canal, in which he recommended its adaptation for vessels of large draught, a measure which was accordingly adopted. He retired from active service in Dec. 1846, with the appointment of captain-superintendent of the royal Clarence yard and of the naval hospital at Haslar near Portsmouth, retaining this position until 1852, when he was compelled to vacate it on attaining the rank of rear admiral of the white. In the following year he was made lieutenant-governor of Greenwich hospital. In the summer of 1854 he was attacked by cholera, which entirely undermined his constitution, and induced him to go to Germany, where he died. Beside the narratives of his 4 voyages, he wrote a treatise on "Nautical Astronomy by Night;" "The Parental character of God;" and a "Lecture to Seamen." His life has been written by his son, the Rev. E. Parry (London, 1857).

PARRY SOUND. See Melville Sound.

PARSEES. See Guebres.

PARSLEY (*petroselinum sativum*, Hoffman), an exogenous hardy biennial plant of the natural order *apiaceæ*. This order is composed of herbs with stems either solid or fistulous and furrowed, leaves usually divided and sheathing at base, and numerous small flowers borne in umbels and surrounded by an involucre; in color either white, pink, yellow, or blue; the fruit (commonly considered as the seed) consisting of 2 carpels separable from a common axis to which they adhere by their face (commissure), each carpel traversed by elevated ridges, of which 5 are primary, and 4 alternating with them are secondary; between these ridges are sometimes lodged receptacles of oily matter called *vittæ*. The plants of this order are extremely rare in the hotter regions of the globe.—The common parsley is a native of Sardinia, and has been cultivated in gardens for 3 or more centuries. Its stem is angular, its leaves shining and tripinnate, the leaflets toothed; its flowers are borne in compound umbels furnished with general and partial involucres; the sepals abortive, the petals 5 and equal; the fruit ovate, contracted at the side, furnished with 5 narrow, equal ridges, the lateral ridge on the edge and each furrowed ridge with one vitta; the albumen plano-convex. The most usual form seen in gardens is what is called the double-leaved or curled-leaved, having a beautiful thick-leaved, curled, and crisp foliage, highly ornamental as well as of superior quality; this however is only a mere permanent variety of the plain-leaved or common form, which used to be solely raised for its leaves, and which is still cultivated. Another is known as the Hamburg, raised for the roots alone, which are cut up and employed in seasoning soups and stews, their superior size rendering them better than the roots of the other varieties. The leaves, as is well known, are the parts usually employed for the table, both for imparting flavor and as a garnish to meats. Parsley is sometimes sown among pasture grasses, to counteract by its presence the tendency to liver rot in sheep. In gardens it should be sown as early as possible in the spring, and a slight covering in winter is found advantageous to the young plants. The Hamburg should be thinned out frequently so that the plants may be allowed as much as 10 or 12 square inches of surface. In medicinal quality parsley is considered pleasant, stimulating, aromatic, and diuretic.

PARSNIP (*pastinaca sativa*, Linn.), a biennial, umbelliferous plant, growing wild in the chalky districts of England near the sea coast, and cultivated for the sake of its root, which has a sweet taste and nutritious qualities, and is used both as a table dish and for cattle. The common parsnip has an angular, furrowed stem, pinnated, smooth leaves, hairy beneath, the leaflets oblong, blunt, crenate-serrate, the terminal one 3-lobed; the flowers are yellow and borne in a compound umbel, usually without involucres; the calyx obsolete; the petals 5, lanceolate, involute, uniform, entire; the stamens 5, pistils 2; fruit thin, surrounded by a broad border, with oil receptacles (*vittæ*), one in each furrow. The parsnip when growing wild by straying from gardens is materially affected in its nature and habits, and its root becomes small, strong, acrid, and virose; but under cultivation in a suitable soil, the root grows to a large size and penetrates the ground to a great depth. The soil it prefers is mellow, deep, and rich, and not apt to dry. The best flavored roots are produced in a soil inclining to sand rather than to loam. The ground in the garden should be spaded deep, as the quality of the crop depends much upon the length of the roots. The usual mode of cultivation is to sow them in drills and thin out as needed; they should be at least 6 inches apart if large roots are required, and sowed as early as possible in the spring; some prefer sowing in the previous autumn. When manure is used, it should be rotten and free from lumps and straw, and no great amount is needed, as the crop is not exhaustive. The early frosts of autumn do not affect the tops and roots, but there is no advantage in wintering them in the ground as some do, and the first renewal of growth in the spring causes them to become tough and have a bitter flavor. The best treatment is to dig them up in the autumn, taking care not to cut the roots, and not to trim off the tops too closely. A cool and dry cellar is better than one in which if stored they might sprout and grow.—Some agricultural writers have recommended the parsnip as an excellent food for swine, and as useful for feeding and fattening all kinds of cattle. A variety called the *coquaine*, the roots of which sometimes run 4 feet deep, is raised in Jersey and Guernsey chiefly for feeding milch cows. According to Sir Humphry Davy ("Agricultural Chemistry"), in 1,000 parts there are 90 saccharine and 9 mucilaginous. In Scotland the roots are largely used for food by the peasantry; and when they are rasped raw and mixed with flour good bread is made of them. In Ireland a sort of beer is brewed from the roots; and wine is made in England by boiling them, adding a little sugar to the expressed juice, and fermenting by yeast, distillation affording a spirituous liquor. The best foreign varieties of the parsnip are the Guernsey, hollow-crowned, and round or turnip-rooted; and in the eastern New England states, the cup parsnip is decidedly preferred. The wild parsnip of American fields is a European exotic, and is regarded as a noxious weed.

PARSON (Lat. *persona ecclesiæ*), in English law, one having full possession of all the rights of a parochial church. (See PARISH.) He is a sole corporation, and possesses the rights of the church by perpetual succession. During his life he has a freehold estate in the glebe, and in the tithes, unless where they are appropriated (sometimes called impropriated) to the lord of the manor or other patron of the living. The word parson has lost somewhat of the importance attached to the name; and 100 years ago Blackstone spoke of it as "depreciated by familiar, clownish, and indiscriminate use," but as still "the most legal, most beneficial, and most honorable title that a parish priest can enjoy." In the United States the word is not understood as having any legal or official meaning, but is commonly used as designating a minister of the gospel; but it is not often applied to a priest of the Roman Catholic or of the Episcopal church, and it has lost so much of its original solemn and official meaning, that it is commonly used in a familiar rather than a reverential or even respectful sense.

PARSONS, THEOPHILUS, an American jurist, born in Byfield, Essex co., Mass., Feb. 24, 1750, died in Boston, Oct. 30, 1813. He was graduated at Harvard college in 1769, and in the succeeding year commenced the study of the law in Falmouth, now Portland, Me., where he was admitted to the bar in July, 1774. During this interval he contributed to his support by teaching a school. He commenced practice with unusually brilliant prospects; but the almost total destruction of Falmouth by a British fleet, in Oct. 1775, having interrupted his career in that place, he returned to Byfield, and for several years received the instruction and assistance of Judge Trowbridge, called by Chancellor Kent "the oracle of the common law in New England." In the library of this jurist, one of the best in America, he laid the foundation of a vast accumulation of legal learning; and the manuscript briefs on questions incidentally occurring to him, which he there prepared, were frequently employed by him with advantage during his subsequent career at the bar and on the bench. Establishing himself in Newburyport, he entered upon a lucrative practice, which gradually embraced all the New England states. At the same time he took a considerable interest in the politics of the day, his opinions being of that conservative stamp which subsequently characterized the federal party. In 1778 he formed one of the so called "Essex junto," a body of citizens of Essex county who opposed the adoption of the state constitution recently framed by the Massachusetts legislature; and a pamphlet, familiarly know as "The Essex Result," stating the principal objections to the proposed constitution and approved and adopted by the "junto," was probably wholly prepared by him. It was widely circulated throughout the state, and had an important influence in causing the rejection of the constitution. In 1779 he was a delegate to the convention which framed the state constitution finally adopted. As a member of the convention which assembled in Boston in Jan. 1788, to ratify the federal constitution, he took an active and influential part in favor of that instrument, and was the author of the "Proposition," offered by John Hancock and subsequently adopted, ratifying the constitution and recommending certain amendments, known in the histories of the times as the "conciliatory resolutions." He occasionally served in the legislature after this, but took no prominent part in public affairs, although to the close of his life he remained a consistent federalist. In 1800 he removed to Boston; and upon the retirement of Chief Justice Dana in 1806, he was appointed to succeed him upon the bench of the supreme judicial court, which position he held at the time of his death. As a lawyer and as a judge he was greatly respected. In the former capacity Justice Story declared that he "had no equal," and was "a head and shoulders taller than any other man in the whole state;" and his judicial opinions were so highly esteemed that a collection of them was published in New York under the title of "Commentaries on the Law of the United States, by Theophilus Parsons, late Chief Justice of Massachusetts." His decisions threw much light upon the laws of pleading, marine insurance, and real property, and he rendered a substantial service to the community by discountenancing delays and expediting the trial of causes. Apart from his professional duties, he was distinguished as a classical scholar, and as a mathematician of considerable ability; and in private life he was esteemed for many amiable qualities. An elaborate memoir of him has been published by his son, Theophilus Parsons (12mo., Boston, 1859).—Theophilus, an American author and jurist, son of the preceding, born in Boston, Mass., May 17, 1797. He was graduated at Harvard college in 1815, studied law with Judge William Prescott, and after a brief visit to Europe entered upon the practice of his profession, first in Taunton, and afterward in Boston. For several years after his admission to the bar he was a constant contributor to the "North American Review," and wrote occasionally for Mr. Walsh's "American Review" in Philadelphia. He was also for some time connected with the "Free Press" and "New England Galaxy" newspapers, and founded and edited the "United States Literary Gazette." He was an early convert to the doctrines of the New Jerusalem church, and has written much in exposition and defence of them in its periodical publications. Two volumes of "Essays" have appeared from his pen, and other smaller works, written for the same objects. In 1847 he was appointed Dane professor of law in the Harvard law school, and has since resided at Cambridge, in the discharge of the duties of his professorship, occupying his leisure in the preparation of legal treatises. He has published the "Law of Contracts" (2 vols., 1853); "Elements of Mercantile Law" (1856); an elementary work called "Laws of Business for Business Men" (1857); and an elaborate and comprehensive treatise on maritime law, including the law of shipping, the law of marine insurance, and the law and practice of admiralty (2 vols., 1859).

PARSONS, Thomas William, an American poet, born in Boston, Aug. 18, 1819. He was educated in the Latin school of Boston, and in 1836–'7 visited Italy, where he imbibed a fondness for Italian literature, one of the earliest fruits of which was a translation of the first 10 cantos of the *Inferno* of Dante, published in Boston in 1843. In the interval he adopted the profession of a dentist, which he has since practised, although devoting his leisure to literary avocations. In 1854 appeared a volume of poems from him, containing "Ghetto di Roma" and other pictures of life in Italy, which he revisited in 1847, and also many pieces suggested by American subjects. He has completed his translation of the *Inferno*, but it has not yet been published.

PARTHENOGENESIS (Gr. παρθενος, virgin, and γενεσις, birth), a name given to the phenomenon in the organic world, believed by many to occur, though still questioned by others, of a production of successive generations of procreating individuals, originating from a single fertilized ovum, but without any renewal, through such series, of fertilization. Ordinarily careful observations seem, at first, to result in the rule that, certainly in the animal realm, and probably in the vegetable, offspring can only arise by means of a union of sexual elements, though this union may be either obvious or concealed. Yet there were those among the earlier writers who held to be possible what they called a *lucina sine concubitu*. M. Bonnet, about the middle of the 18th century, first gave a scientific standing to this opinion, by discovering that the *aphis* (plant louse) may produce a numerous offspring, and these be followed by several generations, without the intervention in any known or conceivable way of the masculine fertilizing principle. M. de Quatrefages proposed to name this result *agamogenesis*, or production without union. The name at the head of this article was applied to certain cases of this kind by Professor Owen. Of Siebold's work on this subject a translation appeared in London in 1857. Strictly, the name parthenogenesis is hardly appropriate, since either the producers in these cases are not perfect ordinary females, or the production is not that of perfect ordinary offspring; or both these circumstances may be true. Siebold investigated this uni-sexual, or at least unusual generation, in certain sac-bearing *lepidoptera*, in the silkworm moth, and in the honey bee. In the first, females only result; in the second, both sexes. Along with Dzierzon, he obtained in relation to the honey bee the most complete set of observations. The queen bee, impregnated once for all for her 5 or 6 years of life, deposits thereafter, at proper periods, the germs of successive swarms or colonies; and the microscope reveals the fact that the eggs destined to become workers (imperfect females) and queens (perfect females) are fertilized, as ordinarily, by contact or penetration of spermatozoids, while those to become drones (males) undergo no such influence; so that the production of these last is agamogenetic. In further proof, if the queen have her wings crippled from the first, so that she takes no flight, she produces only males, thus ruining the hive; and a like result may follow the pinching or freezing of one side of her body, and also, because the spermatozoids have become exhausted, in her old age. So, rarely, the workers may without fertilization produce eggs, but those of males only. But any of these males, though all directly agamic or fatherless, can become efficient in a return to the ordinary or bi-sexual mode of reproduction.—Bonnet's experiments with the aphis yield, as intimated above, more curious results. He carefully isolated a newly hatched aphis by conveying it upon a twig beneath a glass shade dipping into water. Of fourscore offspring produced alive by this insect, one was isolated in like manner, and with similar result; and this was repeated as long as the observations continued, or for 9 successive broods. As the young aphides are ready for propagation in about 2 weeks, it follows that in the course of a summer a single parent may have a progeny of millions, and all without renewed intervention of the male element. Kyber found that when warmth and food were abundantly supplied, this agamic production would go on for 2 or 3 years; but these broods, winged or wingless, consist almost wholly of imperfect females, seldom any males. The true females, always wingless, produce only after sexual union, and then eggs, not living offspring. And ordinarily, as the cold of autumn increases and the supply of food fails, the agamic young give place to true males and females; the latter laying eggs which, the next spring, hatch out again viviparous or imperfect females. Thus there is a cycle of changes; a large but varying number of links of non-paternal, being interposed between any two of paternal generation. The imperfect females have, in place of ovaries, certain tubular organs, the germs lying in which develop into living insects. Thus the case is only apparently, not really, anomalous; the real individual of the aphides is the perfect male or female only, and union of these must occur for the perpetuation of the race; but under favoring conditions, by a sort of exuberance of vital activity, an intercurrent production by gemmation or budding sets in, terminating finally in a return to the normal individual. According to this view, the drone bees are another instance of production by budding; and still others are said to be found in the *daphnia* (water fleas), and in some species of butterfly.—Among examples believed to be found in the vegetable world, the most marked is that of the *cœlebogyne ilicifolia* (literally, "holly-leaved spinster"), sent from Moreton Bay, Australia, to the royal gardens at Kew. This tree is diœcious, and the single specimen found is pistillate; yet in its new locality it has flowered and borne fruit regularly; and though it is claimed that, with perhaps a single exception, no pollen has been found in or upon any of its flowers, yet the seed seems to be perfected, and the numerous plants already obtained from it do not appear to be hybrid. Braun found in one instance a pollen grain and tube on the stigma of the *cœlebogyne*; and he considers the seed of the plant perfect, while Klotzsch finds in it no embryo, but only a bud. It is doubtful whether any of the young plants of this species have as yet matured seed which could be again tested; and possibly the question of agamic production in plants must still be regarded as open. Regel found that after strongly cutting-in female plants of *spinacia* and *mercurialis*, male flowers were constantly developed, but which, without great care, would have been unnoticed; and reviewing these and other supposed cases, he concludes that "parthenogenesis certainly does not occur in plants with evident sexual organs." But Prof. Asa Gray, in apparent consistency with all the known facts, infers that parthenogenesis does occur in plants, and therefore probably not in 2 or 3 special cases nor in diœcious plants only; and that "sexual fecundation may be strictly necessary to the perpetuation of the species, without being strictly indispensable for every generation." ("American Journal of Science and Arts," 2d series, vol. xvii. p. 440.)

PARTHENON. See ATHENS, vol. ii. p. 291.

PARTHIA, in ancient geography, a district of western Asia, the boundaries of which varied at different times. Originally it was a small and mountainous country S. E. of the Caspian sea, and bounded by Persis, Susiana, Hyrcania, Aria, Carmania, and Media, and therefore including nearly all of the modern Kohistan, the northern portion of Khorassan, and a part of the Great Salt desert. It was divided into the districts of Comisene, Parthyene, Choarene, Apavarctene, and Tabiene, of which the two last were in the southern part. There were no cities of great importance. The largest was Hecatompolis, which during the reign of the Arsacidæ was the residence of the royal family. The chief mountains were the Labus or Labutas, probably part of the range now called the Elboorz mountains; the Parachoathras, now called Elwend; and the Masdoranus. The rivers were few in number, and scarcely more than mountain streams, almost dry during the hot season, but violent floods when the snow melted.—The Parthians, according to their own tradition, were of Scythian descent, their name signifying in that language "banished" or "exiles." This was the opinion of the ancients, although many modern writers suppose they were directly connected with the Iranian tribes. In their treatment of their princes and nobles they carried the usual obsequiousness of the oriental forms to excess. They were under the government of a double council, made up of the Magians and the nobles or relations of the king. In war they fought on horseback, the principal weapon being the bow; and the peculiar manner in which they fought, discharging their arrows while retreating, was often referred to by the Roman poets. Polygamy was very common.—The Parthians early became subject to the Persians. In the division of the empire by Darius Hystaspis into 20 satrapies, they, along with the Chorasmians, Sogdians, and Arians, formed the 16th. They constituted a part of the army of Xerxes in the expedition against Greece, and served under the last Darius. Parthia and Hyrcania formed under Alexander one satrapy; and after the death of that conqueror, the inhabitants of the former country joined the cause of Eumenes. Afterward they were governed successively by Antigonus and the Seleucidæ until 250 B. C., when under the leadership of Arsaces they became independent. The new kingdom constantly grew in power, gradually encroaching on the Bactrian possessions on the east, and on those of the Seleucidæ on the west, until the Parthian empire extended from the Euphrates to the Indus, and from the Oxus to the Persian gulf. The conquests of the Romans in Asia finally, about 60 B. C., brought that military nation in conflict with the Parthians. In 53 Crassus invaded their territory during the reign of Orodes, but was completely defeated, he himself being slain and his army cut to pieces. Elated by their victory, the next year they invaded Syria, but were driven back by Cassius, the proconsul of the province. Siding with Pompey in the civil war, and subsequently with Brutus and Cassius, they were defeated by Ventidius, the lieutenant of Antony, in 39, and by the same general again in 38, on the anniversary of the day of the defeat of Crassus, Pacorus, the son of Orodes, being slain in the battle. The war was continued after Phraates IV. ascended the throne, Antony marching into Media in 36, but being forced to depart after suffering severe loss. A treaty was made between the reigning monarch and Augustus, the former being threatened at the same time by the Romans and the disaffection of a large number of his own subjects. In this treaty Phraates restored to Rome the standards which had been taken on the defeat of Crassus. After the death of this monarch, Parthia became for many years the scene of civil wars between various pretenders to the throne. There were frequent conflicts with the Romans, especially in regard to the kingdom of Armenia, and during the reign of Trajan that emperor marched into Asia, and made Armenia and Mesopotamia Roman provinces. This territory was restored by his successor, but war again broke out during the reign of Marcus Aurelius and Aurelius Verus; and the conquests made by Cassius, the general of the latter, which were continued by Septimius Severus and Caracalla, effectually weakened the strength of the Parthian empire. At length, seeing the prostrated condition of the kingdom, Artaxerxes, representing himself as belonging to the ancient dynasty of the Persians, induced that people to throw off the yoke. Artabanus IV., the last emperor of the Arsacidæ, was defeated and slain in A. D. 226, and the new Persian empire, under the rule of the dynasty of the Sassanidæ, took the place of the Parthian.

PARTICIPLE (Lat. *participium*, a partaking), a part of speech which partakes of the properties of both an adjective and a verb, and may be considered as an adjective with the idea of time added or as a verb without the idea of affirmation. In English there are two participles, the present and the past. The former ends in *ing*, but originally in *and*, which termination is seen in the participles of the cognate languages, as *ant* in Sanscrit, *ont* in Greek (as in the genitive *βουλευ-οντ-ος*), *ant* and *ent* in Latin (as in *am-ant-is* and *reg-ent-is*), and *end* in German. The past participle is formed usually by adding *en* or *ed* or *d* to the root of the verb; but the final *d* in some cases becomes *t*. In the power and expressiveness gained by the use of the participles, the modern languages are inferior to the ancient.

PARTITION, in law, the severance of common or undivided interests. It is particularly applied to interests in realty. At common law lands held by two or more persons were held by them either in joint tenancy, in common, or in coparcenery. The first two of these estates were created by the act of the parties. The last was created by operation of the law, when in casting a descent it devolved a single estate upon two or more heirs; as, for example, when an estate in fee of one who left no male succession passed to his daughters or other female representatives. These persons were called coparceners. Theirs was the only joint estate of which the common law would compel a dissolution at the request of a single party. Joint tenants and tenants in common became so, said the law, by their own mutual agreement and act, and the tenancy could be justly severed only by their mutual consent. But coparceners are rendered so by operation of law, and lest any one of them be prejudiced by the perverseness of his fellows, the law will lend its aid, if he ask it, and help him, by partition, to the enjoyment of his separate interest. In the reigns of Henry VIII. and of William IV. special statutes extended this common law benefit, which hitherto coparceners alone had enjoyed, to joint tenants and tenants in common; so that partition then became incident to all estates held in common.—In the United States the technical joint tenancy is quite abolished; joint ownerships being, if not under express statutes, yet in effect, only tenancies in common. So also the technical distinctions between estates in common and in coparcenery have lost nearly all their force. Much therefore of "the cunning learning of partition," as it exists in the English law, is inapplicable here. Yet as among us real property generally passes, on the death of an *ancestor*, to more persons than one, partition still retains an importance in respect to the tenancies in common of heirs and devisees. In some parts of the country, the operation of this remedy is extended by statutes beyond the limits fixed for it by the common law or the statutes of Henry VIII.—Partition, in England, was made either by mutual consent or upon compulsion. In the latter case, the relief was sought either by a writ of partition, sued out by one party, at common law, or by his petition to the court of chancery. If the courts of law ever had exclusive jurisdiction of partition, as it is sometimes asserted, it must have been at a very remote period. For, as early as the reign of Elizabeth, it is certain that chancery took cognizance of the matter, and lately it has enjoyed almost exclusive jurisdiction over it; for the courts of law are rarely invoked to make partition, though their jurisdiction is concurrent with that of chancery. There is good reason, however, for the preference of the chancery courts. The procedure at law in a cause of partition is far less effective than that in equity. The courts of law are limited to a mere allotment according to the proportional shares of the parties in interest; and this often causes a purely mechanical, and so prejudicial, division of an estate. But chancery, not restricted to the exact balancing of equivalent shares, but capable of all equitable adjustments of the matter, may distribute among the claimants the separate, though unequal, parcels of the estate, assigning to the several parties the portions which will best suit their respective condition, equalizing such a partition by decreeing pecuniary compensation to be made, or in other cases ordering equitable payments by some for improvements made in the common property by others. This jurisdiction is exercised with peculiar fitness in all cases where purely equitable rights, conflicting claims of parties, or modes of enjoyment are to be adjusted. Courts of equity will interpose only when the title of their petitioner is clear. If it be contested, he must try it at law. Wherever, in our states, distinct equity courts exist, they probably have *concurrent* jurisdiction with courts of law in respect to partitions, and, in general, such a jurisdiction as has just been described. But in almost all the states the cognizance of partitions is regulated by very minute statute provisions, and to these in each state reference must be made for the particular methods of procedure, and the powers of the courts. In some states the equity process is left undisturbed. In some the writ of partition, with certain modifications, still remains. Generally, however, the mode of obtaining partition is by petition to the higher courts of law. The courts of probate, too, are usually invested with the power to divide estates among heirs and devisees.

PARTNERSHIP, in law, exists when two or more persons combine their property, labor, or skill, or one or more of these, for the transaction of business for their common profit. It may be confined to a specific purpose, or a single transaction; but when not so limited by the words of the partners, or by acts which imply limitation, it is general. All persons competent to do business on their own account may enter into partnership. Generally, the partners own the property and the profits jointly; but one or more of them may own exclusively the property or capital, leaving only the profits to be owned jointly. So all kinds of property may be owned by a partnership. But when real estate is owned, the law of record title, of transfer by deed, of inheritance, and of dower, has still an important operation. Generally the rule is this: real estate is partnership property when it is bought with partnership funds, for partnership purposes, and is used for these purposes. Then it will be treated as part of the capital of the firm, and just as personal property is treated, so far as liability for the partnership debts is concerned, and until the remaining balance is ascertained and divided among the partners; but then its character as real estate is restored with all the incidents of dower and the like. The legal title must always be traced through the records. But if the property be, for example, in the name of one partner, he will be regarded as holding it in trust for the partnership; and if he die, his heir will be held as trustee, and only so much as is not wanted to pay the debts of the firm, or satisfy the claims of the other partners, will be permitted to remain in his hands, as his own and *free* from the obligations of the trust. So, the widow has her dower in the real estate after debts and claims are satisfied, and not before.—The good will of a partnership is, for many purposes, a part of its property, and may be transferred by sale or assigned for the benefit of creditors; and it would undoubtedly pass to the assignees under insolvency, by operation of law.—No partner, and no majority, can introduce a new partner without the consent of the others. A partner may sell out all his interest in a partnership, or may assign it as security for a debt; but the purchaser or assignee only acquires a right to have the balance due paid to him, and cannot acquire merely by the transfer a right to become a partner.—A partnership may be formed by an instrument under seal, which is perhaps the most common, or by a written instrument without seal, or by oral agreement, without any writing. In general, a partnership is formed by an agreement that the parties shall enter together into a certain business, and share the profits and losses. In the absence of special stipulations, the partners share equally, but may stipulate about this as they will. So the agreement may provide for its duration, but if the period appointed for its termination arrives, and it continues in fact, and without a new bargain, it will be held to continue upon the former terms.—Persons may be partners as to third persons who deal with the firm, while they are not partners as between themselves. Thus, A may agree with B and C that A shall render certain assistance to the firm of B and C, either of capital, credit, or skill, and not be held out as a partner, nor be a partner, and own a certain proportion of the profits, and not be liable for any share of the losses. Then, if the firm be not insolvent, A may claim of B and C his share of the profits, and, if obliged to pay any debt or loss of the firm, may claim compensation from B and C. But nevertheless, he will be just as liable to the creditors of the firm as B or C; and all his property will be as liable as their property. There have been many cases turning on this point, but the principle of law is clear and certain, however difficult it may sometimes be to apply it. This principle is, that whether a person is a partner in the firm in regard to the rights and obligations among the partners, depends upon the agreements they have made; but, whatever these agreements are, he is a partner as to third persons, that is, he incurs as to them all the responsibilities of a partner, in two ways, and on two grounds. One is, that he was, by his own consent, or by his own fault, held out to the world as a partner, so as to justify the creditors of the firm in dealing with it as if he were a partner; and the second is, that, without being so known or held out, he participates in fact in the profits of the concern. For it is a nearly universal rule, that one who participates in the profits, as such, is liable for the losses. The principal and most difficult question which has arisen on this subject, relates to clerks or salesmen who are paid by a share in the profits. Formerly it was held, that if such a person was paid, for example, "one twentieth part of the profits," this made him a partner, and liable as such; but if he was paid "a sum equal to one twentieth part of the profits," this was only a payment of wages, which was indeed measured by the profits, but did not make him a partner. But this technical and irrational distinction has passed away; and now the question in every such case would be: Does his bargain with the partners merely provide that his compensation shall be measured by the profits? for then he is only a person employed by the firm and not a partner; or does the bargain give him a property in the capital or in the profits? for this would make him liable as a partner. In other words, if the alleged partner has a right and property in one twentieth (or any other proportion) of the profits, while they remain undivided, he is a partner and liable as such; but if he have no such right or property, but only a claim against the firm for so much money as, upon a settlement of the firm's profits, one twentieth of them shall amount to, he is not a partner, and has none of the liabilities of that relation.—It is sometimes important to determine whether property is held by persons as tenants in common, in which case it goes to all their creditors, or whether it is held by them as partners, in which case the partnership creditors have an exclusive right to the partnership effects. Thus, A and B own a ship, each having half; they agree to buy a cargo in the same proportions, and to ship it for sale, the returns to be divided equally. They fail. If they are partners in the cargo, those whom they jointly owe for it have an exclusive claim on the returns from it. If they own it only as tenants in common, each one's half goes with the rest of his property to be divided among all his creditors. In such a case it was held that they were only tenants in common; and the general rule is, that to constitute a partnership there must be a joint purchase, from a joint fund or on a joint credit, of effects to be used in business, the account and profits to be kept separate from that of other property of the same parties, and the profits to be owned jointly.—It is a general rule, both in England and in the United States, that no partner can sue another at law on any matter growing out of and connected with the transactions of the partnership business, and dependent for its determination upon the partnership accounts. One reason for this ancient and well established rule may be, that no individual partner has any separate right or interest in any of the goods or accounts of the firm, because all are owned by all the partners jointly. But the principal reason is, that any one such question involves others which a court of law has no adequate means for investigating. For if a partner recovered on this claim against a partner, there are multitudes of other claims or accounts, on each of which another question may be raised; and whether, on the whole, one partner owed another or had a claim against him, must depend upon a settlement of all the business and an adjustment of all the accounts. This a court of equity can direct and supervise by its machinery of masters, receivers, and the like, although a court of law cannot; and therefore it is now settled, as a general rule, that questions between partners about partnership affairs must go before a court of equity and not a court of law. But a partner may sue a partner at law in any matter not involving the partnership accounts; and so if a distinct part thereof is severed from the rest, and especially if a separate promise is made about this, a common action at law is maintainable for the balance. If, as is not unfrequently the case, a man is a member of two firms, one of those firms cannot sue the other at law, because the same person cannot be plaintiff and defendant. But if one of the firms holds the negotiable paper of the other, it may indorse it to a third person, who may sue the other firm.—Partners are of various kinds. They may be open or secret, active or dormant, retiring or new-coming. A secret partner is just as liable for the debts of the firm, when he is discovered, as an open and declared partner; so a dormant partner who only lends his capital or his name, and takes his profits, is just as liable as an active partner; for the one rule, which lies at the foundation of the whole law of partnership, is, that each partner, and the whole of his property, is liable for the whole of the partnership debts. This rule was until recently a universal one, and would be so now but for the special partnership recently introduced into this country from Europe. (See PARTNERSHIP, LIMITED.) A retiring partner who continues to receive a share of the profits continues to be liable for the debts of the firm, but is not made liable by receiving a certain definite sum, annually or otherwise, independently of the profits. He should give notice of his retirement; for those who deal with the firm in ignorance of his retirement, without their fault, may deal with it on his credit, and are authorized to hold him responsible. But if the retiring partner gives such general notice in the usual way, he is not liable to a customer who happened not to know of his retirement; and a new customer, who had no dealings with the firm before the retirement of this partner, cannot hold the partner after retirement without notice, unless it can be shown that he came to the firm on the credit of this partner, and that he was justified in trusting to this credit. So if a creditor of a firm, knowing of such retirement, receives for his debt the negotiable paper of the firm, the presumption of law is that he intended to discharge the retiring partner; which presumption can be refuted only by evidence of an honest and actual intention to the contrary. A nominal partner, who lends his name to a firm without any interest whatever, is, in general, just as liable as if he were actually interested. If one purchase goods separately, and owe for them, those who become subsequently interested in the goods jointly with the first purchaser are not thereby made liable for the debt, unless the purchase was made originally by their joint authority, and for the purpose of bringing it into the partnership; for then the partnership existed at the beginning.—Throughout the commercial world, it is a universal rule, that each partner has full power and authority to act for the others and represent the whole firm in all matters appertaining to the partnership. There is perhaps no exception or limitation to this rule, other than by the principle that either partner's powers may be restrained by agreement, and all persons to whom this agreement is communicated are bound by it. Hence, on the continent of Europe, it is very common for the circulars or cards announcing a firm to state specially which of the members is authorized to make purchases in one place or in another, or to draw or accept bills, and the like. Where there is not this agreed and declared limitation, each partner may make purchases, sales, loans, assignments, pledges, or mortgages of the partnership property, and give or receive notes or bills or money therefor; and any such transaction, done in reference to and within the scope of the partnership business, and with honest intent on the part of the person dealing with the firm, binds the firm and all the partners in regard to that person, however fraudulent the transaction may be in reference to the other partners. But if a partner, who has borrowed money in his own name, brings that money into the partnership, the partners are not thereby made liable for the debt; the firm owes the borrowing partner, and he alone owes the lender; and one who lends money to a partner, for the very purpose of enabling him to contribute the same to their capital, cannot hold the other partners without their assent.—Some partnerships are carried on in the name of an individual, who may also use his own name in his own business. In that case, paper bearing his name will be supposed to relate to his private and individual business, unless direct evidence or circumstances show it to have been on the firm's account. But if a partner is a trustee for any body, and applies the trust money in his hands to the partnership account, the partners are certainly liable if they knew of this application of the trust money and did not prevent it, and, according to some authorities, even if they had no knowledge of it. A release by one partner, or to one partner, is a release by or to the firm, if there be no fraud; so a notice by or to one is notice by or to all.—The question sometimes arises, how far a new-coming member is responsible for a former and existing debt. The general answer is, that he is not so liable without his adoption of the debt; but this adoption may be shown by his express agreement, either with the firm or with the creditor, or it may be inferred from circumstances which distinctly indicate it; and it has been held that a payment by the firm, after he enters it, of the interest on an old debt with his knowledge and without objection by him, implies his adoption of the debt as due from his firm. But the liability of a new-coming partner for the existing debts of the firm cannot be presumed from the mere fact of his entering into the firm.—Whether a majority of the partners can bind a minority, and conduct the business of the firm at their pleasure, may not be quite settled; but the later authorities seem to confine this power of a majority to what may be called the domestic affairs of the firm, as the hiring a room or store, keeping clerks or books, and the like. At the same time it seems to be now well established that a partner who dissents from an inchoate and incomplete transaction, and distinctly expresses his dissent to the outside parties concerned in the transaction, giving them notice that he shall not be bound by the action of the firm, may in this way protect himself from liability. It should be added, however, that the recusant partner, after such denial and notice, may waive it, and will be considered as doing so if he permits the proceeds or avails of the transaction to be brought into the common account and the common fund for the common benefit.—The dissolution of a partnership, however caused, has no effect upon its existing debts, or upon the liability of the partners for them; but it entirely prevents the contracting of any new debt by the firm, because that has ceased to exist. Hence the former partners can in no way bind by any new contracts. Thus, no partner can indorse a note of the firm, either with the firm's name or his own, even if it be to pay a debt of the firm; and even authority given by the firm to one partner to settle the affairs of the firm would not, generally, carry with it the power to make such indorsement. Dissolution may take place in many ways. 1. By the expiration of the time when it is to terminate by the articles; but if it goes on as before, although nothing be said, the law will presume an agreement to continue it on the former terms. 2. It may certainly be dissolved at the pleasure of either partner, if there be no limited term in the articles; and if there be, and even if there be a mutual covenant not to dissolve, we should say that either partner might dissolve the copartnership at his pleasure, always being liable to respond in damages for any injury he may inflict by his breach of contract. But a court of equity would probably interfere to prevent a causeless or fraudulent dissolution, especially if it were obvious that injury would be done which could not be adequately compensated by damages. So a court of equity would always decree a dissolution at the prayer of any partner, if he could show good cause, of sufficient magnitude; and in any such case the court would appoint a receiver if that were necessary, and do or order all other things which the interests and equities of the parties required. 3. An assignment by a partner of his whole share and interest in the copartnership property and business would of itself, as we think, work a dissolution; and it would be so even if one partner assigned his whole share to another partner, because this would be equivalent to this partner's going out of the firm. 4. Any departure from a firm or copartnership by any partner dissolves that firm, however it be caused. The firm may go on as before, taking in or not new partners, but it is in law a new firm, for the simple reason that a partnership is in no sense or measure a corporation. Hence, the death of any member of a firm dissolves that firm. Even if the articles provide for that casualty, and it is agreed that the firm shall go on with unchanged name, and that no account shall be taken, but the share of the deceased be paid to his representatives by cash or notes to a certain amount, still in law the old firm ceased when the partner died, and a new one began. 5. Bankruptcy of the firm, or perhaps of any partner, dissolves the firm at once. Whether the insanity of a partner has that effect may not be certain, but we should say that insanity which would probably be permanent would unquestionably be a good ground for dissolution by the court or by the parties, but that it would not of itself, and by its own force, effect a dissolution.—If a partnership is dissolved by the death of a partner, the whole property and business pass to the survivor or survivors, but only for the purpose of settling up the business and closing the concerns of the partnership as soon as this can be done in a proper way. The surviving partners and the representatives of the deceased may come to some agreement about this, or the articles may provide for such an event. But in the absence of any such agreement or provision, the survivors take every thing, with the powers necessary for the speediest and best settlement, and no more; nor can they, even for the purpose of settlement, make new contracts binding the estate or representatives of the deceased. When the settlement is finally and fully made, the survivors must pay over to the representatives of the deceased the share due to the estate; but until then the representatives cannot interfere with the management of the property, although a court of equity will interfere, on their petition, to prevent waste, delay, or other injurious conduct by the survivors.—The rules of law in regard to the rights of creditors over the funds of the partnership, and the property of the partners, are very important, but in some particulars they are not quite settled. It is certain that the joint funds of the partnership are, in the first place, to be applied and appropriated to pay the joint debts, that is, to pay the partnership creditors; and the private creditors of the individual partners cannot touch the partnership funds in any way until these have paid in full all the partnership debts. It is also certain that the private creditors of an individual partner may reach by any proper process of law the private and separate property of the partner who is their debtor. So, too, it is certain that the creditors of the firm may, at some time, resort to the private property of the partners. The uncertainty is involved in this question: While the creditors of the firm have an exclusive right to the property of the firm, have the private creditors of the partners an equally exclusive right to the private property of the indebted partners? Formerly it was not so; and while a creditor of A, of the insolvent firm of A and B, could not touch the funds of the firm until the debts of the firm were paid and a balance found due to A, which balance his creditor might reach, it was at the same time held that a creditor of the firm could resort to the private property of A or B as freely as to the joint funds of A and B. The obvious inequality of this rule has caused some of our courts—as in New York, Pennsylvania, and New Hampshire—to give to the private creditors the same prior right to the private property, that the joint creditors have to the joint property; and the same rule is favored in England. But in most of the states, as far as we can judge from existing decisions, the old rule still continues.—What right a creditor of a partner in a solvent firm has, and how he may effectuate his right, is a matter of much uncertainty. The prevailing principle may however be stated in this way. The creditor can take only what his debtor has. This is not a several and distinct right to or property in any part of the partnership funds; for it is only an ownership of the whole in common with the other partners, and thence a right to have the accounts settled, and the debts of the firm paid, and then his share of the balance set off or paid to him in severalty. This right or interest his creditor may acquire by attachment or levy; and if it be done by attachment, a frequent and generally speaking the better way, is to summon all the partners as trustees or garnishees under the process of foreign attachment.

PARTNERSHIP, LIMITED (or, as it is sometimes called, special partnership), a partnership whereof one or more of the members contribute a certain amount to the capital, which may be lost by its being demanded for payment of the debts of the firm, but beyond which they have no further liability. This is utterly unknown to the common law, or to the law merchant as existing in England and in the United States. It has however been common on the continent of Europe for a long time. Recently it has been adopted in this country, and is now common. The following states have statutes authorizing limited partnership, and there may be others: Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Maryland, Virginia, South Carolina, Georgia, Florida, Alabama, Mississippi, Kentucky, Michigan, Indiana, Illinois. After much opposition, it has to some extent become established in England. It has made a partnership partially resemble a corporation. A stockholder in a corporation may lose his stock, but not be made liable any further, unless by special statutory provision; whereas every partner is liable *in solido* for all the partnership debts. From this liability capitalists were unwilling to place any part of their capital in a trading company, because their whole fortune would be at risk. It was thought that it would be better for the commerce of the country, that young merchants and others with skill and enterprise but not capital, should be able to induce those who had available funds to place them in the business; for then it rested on a real capital and not on mere credit or possible profit; and the capitalist, who would be entitled only to a certain portion of the profits, would be exposed only to a proportionate liability. The system is believed to have been found to work well in practice, wherever it has been introduced. The statutes of no two states, perhaps, are precisely the same; but they agree substantially in the following provisions: 1, there must be one or more general partners, all of whom are liable *in solido*; 2, there may be one or more special partners, and the specific sum contributed by each special partner must be actually paid in; 3, the arrangement or articles of partnership must be in writing, must generally be acknowledged before a magistrate, and must be published in one or more newspapers; 4, this advertisement, or publication, must state accurately the names and residences of the general partners, the names and residences of the special partners, the name of the firm, the sum which each special partner contributes, the business to be transacted, and the period for which the partnership is made or the time when it will terminate; and during that time the special partner cannot withdraw his capital. In some of the states there are provisions limiting special partnerships to mercantile business, and excluding insurance, banking, &c. If any of the requirements of law are disregarded, the special partner becomes a general partner, and is liable *in solido*. The courts apply these rules with much severity. Thus, a special partner has been held liable *in solido* because, by an error of one of the newspapers, the sum he contributed was stated erroneously; and in another case, because he sold out his interest to a general partner for more than he put in, this being considered as a withdrawal of his capital.

PARTON, JAMES, an American author, born in Canterbury, England, Feb. 9, 1822. At 5 years of age he was brought to New York, where the rest of his childhood was passed; and at 19 he became a teacher in an academy at White Plains, Westchester co., at which he had received his education. Subsequently he was occupied for several years in the same capacity at Philadelphia and New York. His first literary employment was on the staff of the "Home Journal" of New York, with which he was connected about 3 years. In 1855 appeared his "Life of Horace Greeley," of which over 30,000 copies have been sold, and which was followed in 1857 by his "Life of Aaron Burr." Of this work, the most elaborate biography of Burr yet published, nearly 20,000 copies were sold during a period of great commercial distress. His last publication, "Life of Andrew Jackson" (3 vols. 8vo., 1859–'60), in the preparation of which, as in that of the life of Burr, he had access to a mass of original documents, has proved equally successful in a pecuniary point of view. In 1856 Mr. Parton published a collection of "Humorous Poetry of the English Language, from Chaucer to Saxe." He is now (1861) engaged upon a biography of Benjamin Franklin.—SARA PAYSON WILLIS, wife of the preceding, better known by her *nom de plume* of "Fanny Fern," born in Portland, Me., July 7, 1811. Her father, Nathaniel Willis, for many years editor of the "Boston Recorder," removed to Boston with his family when his daughter was 6 weeks old, and in that city she passed her early years. Her education was received at the school of Miss Catharine E. Beecher at Hartford, where Mrs. Harriet Beecher Stowe was then a junior teacher. She was married to Charles Eldredge, cashier of the merchants' bank, Boston, with whom she lived for a number of years in affluence and happiness; but upon the death of her husband she was suddenly thrown upon her own resources to provide a maintenance for herself and two children. After unsuccessful attempts to procure employment as a teacher and in other vocations, she turned her attention in 1851 to literature, and prepared a short essay for publication, which was rejected by the editors of several Boston journals to whom it was offered. One of them at length ventured to purchase it for half a dollar; it proved successful, and was followed by a number of others, which were widely copied by the public journals, until her pseudonyme of "Fanny Fern" was familiar in all parts of the United States. A collection of these sketches was published in 1853 under the title of "Fern Leaves," of which 70,000 copies were sold in a short time. This was followed by "Little Ferns" (1853), "Fern Leaves, Second Series" (1854), "Ruth Hall," "Rose Clark," "Fresh Leaves" (1857), and "The Play Day Book" (1857), all of which have enjoyed a considerable popularity. They have all been republished in England, and some of them have been translated into French and German. For the last few years she has been chiefly employed in writing for the "New York Ledger." Soon after the commencement of her literary career she removed to New York, where she has since resided. She was married to Mr. Parton in Jan. 1856.

PARTRIDGE, the popular name of the family of *perdicidæ*, which includes also the quails. They differ from the grouse in having the legs bare and the nostrils protected by a naked hard scale; they are also smaller in size and more numerous in species; the head seldom has a naked space around the eyes, and the sides of the toes are hardly pectinated; they are widely distributed over the globe, but the true partridges, or *perdicinæ*, have no representative in America. Great confusion exists in the application of the term partridge; the spruce partridge is the Canada grouse (*tetrao Canadensis*, Linn.); the partridge of New England is the ruffed grouse (*bonasa umbellus*, Steph.); the partridge of the middle and southern states is the quail (*ortyx Virginianus*, Bonap.); several other quails are called partridges, as the plumed and Gambel's of California, the scaled or blue and the Massena of the valley of the Rio Grande in Texas; on the other hand, the birds called quails in Europe belong to the partridges and to the genus *coturnix* (Möhr.); such of the so called partridges, therefore, as are not described here will be found under GROUSE and QUAIL, and the francolin partridges under FRANCOLIN.—The typical partridges belong to the genus *perdix* (Briss.); the bill is short, broad at the base, with the apex curved and vaulted; the wings moderate and rounded, with the 3d, 4th, and 5th quills longest; tail short and greatly concealed by the coverts; tarsi without spurs or tubercles; toes long, inner shorter than outer, hind one short and slender, and claws moderate and slightly curved. There are about a dozen species in the temperate parts of the old world, some constant residents and others migratory, some frequenting cultivated lands and others forests; though occasionally perching on trees, they are generally seen on the ground, searching for grain, seeds, bulbous roots, and insects; the nest is a slight hollow on the ground, beneath some bush, and the eggs are from 12 to 20 in number. The common or gray partridge (*P. cinerea*, Lath.) is about 12 inches long, with an alar extent of 20; the body is round and stout, the head small, and the legs and tail short. Though the plumage has no brilliant colors, it is very neat, and its intricate upper markings of ash-gray, yellowish brown, brownish black, and brownish red are pleasing to the eye; the scapulars and wing coverts are darker, with whitish streaks; the forehead, cheeks, and throat light red; neck ash-gray, with minute black undulations; sides with broad bands of brownish red, and a large patch of the same on the breast. The female is a little smaller, with the upper parts browner and the top of the head streaked with yellowish; both sexes present considerable variations. It is spread abundantly over Europe, and is sometimes found in N. Africa, generally in the vicinity of grain fields and very rarely in woods; it runs with great speed, squatting close to the ground when alarmed; the flight is rapid, direct, low, and accompanied with a whirring sound; it is wary, and easily frightened; the affection for the young, or pouts, is very remarkable, and various devices are used by the parents to distract attention from the brood. During winter they keep together in coveys, searching for food among the stubble; they separate early in spring, pairing in March, the eggs being laid in June; the males take no part in incubation, but watch the nest. The genus is monogamous. This is one of the best game birds, as its flesh is tender and well flavored; shooting it forms a favorite and exciting amusement, especially in Great Britain; the bird is so prolific that, with protection during the breeding season, their numbers do not materially diminish, and the markets are so well supplied that the price brings them within the reach of the middling classes. The partridge thrives well in captivity, and its inclination to the neighborhood of man seems to indicate that with proper treatment and food it might be added to the list of domesticated birds. It is not only the victim of man, but of carnivorous mammals and birds, to the last of which it is peculiarly exposed on account of its terrestrial habits and short flight. The passenger partridge (*P. Damascena*, Briss.) is generally considered a variety of the last; it is smaller, much wilder, with greater powers of flight, and decidedly a migratory bird.—The Guernsey or red-legged partridge belongs to the genus *caccabis* (Kaup); in this the bill is more arched and the tarsi are armed with a blunt tubercle. This species (*C. rufa*, Kaup) is 14 inches long, with an alar extent of 21; the bill and feet are bright red;

upper parts reddish brown tinged with gray; a black band from the bill to the eye, and thence down the neck, becoming wider and meeting in front that of the opposite side; lower parts ash-gray and light red, and sides banded with the same and black and white. It is confined chiefly to the southern countries of Europe and to Asia and Africa; it is found also in the islands of Guernsey and Jersey; its flesh is highly esteemed, but it affords less sport than the common species from the separation of the flock when pursued by dogs; it is also believed to drive off the gray partridge. The Greek or rock partridge (*C. Græca*, Briss.) is larger than the last, and has the plumage more ashy; it inhabits the mountainous regions of Greece, Turkey, and Asia Minor, and is probably the species alluded to in the Hebrew and other ancient writings; the flesh is white and much esteemed, though it is occasionally bitter.—The genus *ithaginis* (Wagl.) has a short stout bill, lengthened and rounded tail, long tarsi armed with 2 or 3 blunt spurs, and the toes and claws long. Here belongs the sanguine partridge (*I. cruentus*, Hardw.), from the mountains of N. India; it is slate-colored above with yellow streaks, and greenish yellow below irregularly spotted with red; edge of tail coverts and vent red; it is nearly as large as a pheasant. The genus *ptilopachus* (Swains.), from W. Africa, has a small slender bill, long tail, and unspurred tarsi. The genus *lerwa* (Hodgs.) has a short and much curved bill, the sides of the upper mandible much dilated and covering the lower, wings long, tail moderate, tarsi plumed below the knee and armed with a small spur, the toes long, and claws robust. The type of this genus (*L. nivicola*, Hodgs.) is found in flocks among the rocks and brushwood near the snowy mountains of N. India; it feeds on buds and leaves of aromatic plants and on insects, and is highly esteemed as a game bird. The genus *rollulus* (Bonn.) has a short strong bill, unarmed tarsi, and moderate toes, the hind one destitute of claw. The species are found in the Indian archipelago, and the best known is the crowned partridge (*R. roulroul*, Scop.), common in Sumatra and Borneo; it is 10 inches long; bill above black, beneath orange; eyes surrounded by a naked orange skin; plumage blackish with violet and green reflections; head and neck velvet black; crown white, behind it a semicircular crest of loose reddish brown feathers, and in front of it several long bristles; the wings brownish black; under parts bluish black; shoulders, rump, and tail muddy green. The female is of a general deep green color, with dusky head and tawny brown wings, according to Latham.

PARTRIDGE, ALDEN, an American soldier, born in Norwich, Vt., about 1785, died Jan. 16, 1854. He was graduated at the U. S. military academy at West Point in 1806, and acted as assistant professor and afterward professor of mathematics in that institution from that time until 1813. He was professor of engineering from 1813 to 1818, and superintendent from Jan. 1815, to Nov. 1816, and from January to July, 1817. In 1818 he left the service, with the rank of captain. He was the principal of the exploring survey sent out in 1819 to determine the N. W. boundary of the United States. He founded in 1820 at Norwich, Vt., a military academy, which was afterward removed for a time to Middletown, Conn., but restored to Norwich and incorporated as Norwich university, with Capt. Partridge as its president. He subsequently founded similar institutions in Pennsylvania, Virginia, and Mississippi, was chosen surveyor-general of his native state in 1822, and was 5 times a member of the Vermont legislature, from 1833 to 1839.

PARTRIDGE BERRY, a smooth and trailing small evergreen herb, of the natural order *rubiaceæ*, the *Mitchella repens* (Linn.), commemorating the botanical acquirements of Dr. John Mitchell, an early correspondent of Linnæus, who resided in Virginia. This exceedingly pretty little creeping plant, very common in New England, is found in shaded woods throughout North America, growing near the foot of pine and cedar trees especially; its leaves are roundish and variegated with whitish lines upon a dark green surface; its short petioles have minute stipules; its flowers are white and fragrant, sometimes purplish tinted, and are borne in twos, succeeded by dry-pulped scarlet berries, which are slightly mucilaginous and quite tasteless, lasting throughout the entire winter. It is not unusual to find the berries of the preceding year accompanying the fresh flowers. These bright-colored berries are sometimes called two-eyes and cats'-eyes, from the circumstance of the 2 calyces marking the 2 ovaries appearing on the same fruit, which is the joint produce of the 2 flowers.—The name partridge berry is also frequently applied to the *Gaultheria procumbens* (Kalm), more commonly called wintergreen. (See WINTERGREEN.)

PARTRIDGE WOOD, a kind of wood prized in cabinet work on account of its shaded and beautiful appearance. The tree which furnishes it is unknown in the latest botanical systems, though called by Aublet *bocoa prouacensis*, who gives an account of it in his *Plantes de la Guiane Françoise* (London and Paris, 1775). He remarks that it is found in the woods of Caux, and intimates that its heartwood might be employed in making blocks and pulleys, but says nothing of its being an article of export. Guibourt, author of a notice on the indigenous and exotic trees and woods of Guadeloupe (Paris, 1836), mentions the same as being a tree growing in Cayenne to the height of 60 feet, and called there *boco*, but on what authority he does not state.

PARUTA, PAOLO, an Italian author, born in Venice in 1540, died there in 1598. He was educated at the university of Padua, and after filling several public offices was chosen historiographer of the republic. The result of his labors, embracing the period between 1518 and 1551, is included in the series called *Istorici Veneziani*. In 1592 he was sent as ambassador to Rome, and on his return to Venice was made a knight and *procuratore* of St. Mark. His principal work is entitled *Discorsi politici* (Venice, 1599), a series of disquisitions on Roman and modern history, distinguished by their impartiality, sagacity, and independent train of thought. He also published a work *Della perfezione della vita politica* (1579), a history of the Turko-Venetian war in the island of Cyprus, and valuable notes on Tacitus.

PAS-DE-CALAIS, a maritime department of northern France, formed principally from the old province of Artois, bounded N. by the strait of Dover (Fr. *Pas de Calais*), E. by the department of Nord, S. by Somme, and W. by the English channel; area, 2,505 sq. m.; pop. in 1856, 712,846. It is intersected from S. E. to N. W. by a chain of hills which give rise to several rivers, the most important of which are the Scarpe and the Lys, branches of the Scheldt, and the Aa and the Canche, flowing respectively into the German ocean and the English channel. These rivers are navigable and united by canals. The northern railway and its branches cross the department. Coal is found in small quantities. The soil is marshy in some districts, but is generally fertile. Much land is devoted to the growth of beets for the manufacture of sugar, more being raised in this department than any other except Nord. The manufacture of tulles is carried on at Boulogne and Calais; while other towns are engaged in making cotton and linen stuffs and yarns, spirits, leather, gunpowder, soap, glass, and earthenware. The chief town is Arras, formerly the capital of the province of Artois.

PASARGADA, or **Pasargadæ**, the capital of ancient Persia under Cyrus and Cambyses, and previous to the foundation of Persepolis, situated on the small river Cyrus (now Koor), in a plain surrounded upon all sides by mountains, and about the centre of ancient Persis proper. Its name is translated by Stephen of Byzantium, "the encampment of all the Persians." The modern Murgaub occupies its site, and the whole adjoining plain is strewn with its relics. Among these is a tomb called by the natives the tomb of Solomon's mother, but which is supposed by Rawlinson and others to be that of Cyrus. On a square base, composed of immense blocks of white marble, that rise in steps, stands a quadrangular house or chamber, built of blocks of marble 5 feet thick, shaped at the top into a sloping roof. The chamber seems to have held a sarcophagus. Upon pillars near by repeatedly occurs the inscription in Persian and Median: "I am Cyrus the Achæmenian." This is the exact description given in Arrian of the tomb that held the remains of Cyrus in the time of Alexander, and the existence of which at this place was vouched for by Aristobulus, one of Alexander's companions. The ancient city was esteemed by the people for its antiquity, and was under the especial protection of the magi. It contained the most ancient royal palace and the treasures. The Persian kings were inaugurated there. The city was the stronghold of a tribe of the same name, the noblest of the 3 principal tribes of the ancient Persians. The Achæmenidæ, to whom Cyrus, Darius, and other kings belonged, and who were in fact the royal family of ancient Persia, were a clan of the Pasargadæ. They were apparently the direct descendants of the original Persian tribe which emigrated from further east about 1500 B. C., and which as it rose to power imposed its name upon the people and the country.

PASCAGOULA, a river of Mississippi, formed by the junction of the Leaf and Chickahay. It flows in a southerly direction into Mississippi sound, through two separate mouths, its embouchure forming Pascagoula bay. It is navigable for 100 m. or more by small vessels, which export timber, turpentine, and other products of the pine forests through which it flows. The name is derived from that of the Pasca-ogoulas ("Bread-eaters") or Pascagoulas, a tribe of Indians formerly inhabiting the vicinity. On the E. mouth of the river is the village of Pascagoula, or East Pascagoula, which contains several hundred inhabitants and a large hotel, and is much frequented as a summer watering place. There are extensive saw mills in the vicinity.—The mouth of Pascagoula river is celebrated for the "mysterious music" which may often be heard there on still summer evenings. The listener being on the beach, or, yet more favorably, in a boat floating upon the river, a low, plaintive sound is heard, rising and falling like that of an Æolian harp, and seeming to issue from the water. The sounds, which are represented as indescribably sweet and plaintive, cease as soon as there is any noise or disturbance of the water. The actual occurrence of this phenomenon, not only at the mouth of the Pascagoula, but at other points on the same coast, is fully attested by unquestionable evidence. It is the subject of various legends and traditions, but the most plausible conjecture in explanation of its origin is that it is occasioned by some species of shell fish or other marine animal. A somewhat similar phenomenon is mentioned by Sir Emerson Tennent as occurring in certain situations on the coast of Ceylon.

PASCAL, Blaise, a French author, mathematician, and philosopher, born in Clermont, Auvergne, June 19, 1623, died in Paris, Aug. 19, 1662. His father was president of the court of aids in his native city, and was a man of considerable learning. Being left a widower, he sold his office in 1631, and removed to Paris with the intention of devoting himself to the education of his son and two daughters. He directed the studies of the son to languages and general literature, avoiding every thing connected with the exact sciences. This only sharpened the desire of the boy, now 12 years of age, for the forbidden studies. Without assistance, and ignorant even of the very rudiments of mathematics, he secretly applied himself to drawing and reflecting upon geometrical figures, until he had gone through a series of definitions, axioms, and demonstrations that brought him as far as the 32d proposition of Euclid. His father, discovering him one day engaged in these studies, was affected to tears, and, obeying what he considered a providential warning, willingly gave him mathematical instruction. Blaise made wonderful progress in this new career; he was soon admitted to the meetings of scientific societies, where his attainments and genius astounded the most learned; and at the age of 16 he composed a "Treatise on Conic Sections," which Descartes, to whom it was submitted for examination, could not believe to have been written by a mere boy. Unfortunately the manuscript has been lost. In 1639 Blaise accompanied his father to Rouen, where the latter had been appointed superintendent of finance for the province of Normandy; and there he invented a calculating machine, which was subsequently improved by L'Épine and Boitissendeau, but it never came into practical use. He published an account of it in 1645 in pamphlet form, with a dedication to Chancellor Séguier, and in 1650 offered it to Queen Christina of Sweden, in a letter which has been frequently reprinted. It was also during his stay in Rouen that he invented the *vinaigrette* (wheelbarrow chair), the *haquet* (a kind of dray), and, according to some, the hydraulic press. His health, which had never been strong, was seriously impaired by his labors, and his subsequent life was a succession of sufferings. From 1646 to 1648 he executed on the Puy-de-Dôme, near Clermont, at Rouen, and at the tower of St. Jacques-la-Boucherie in Paris, a series of barometrical experiments, which went far to confirm the discoveries of Galileo, Torricelli, and Descartes respecting the weight and elasticity of air. Pascal was led by these experiments to use the barometer as an instrument for levelling, and for ascertaining the pressure of fluids upon the sides of the vessels containing them, and establishing the laws of their equilibrium. His *Expériences touchant le vide* were published in 1647, and were assailed by Father Noël, a Jesuit, who presented himself as the champion of the old system, and whom Pascal answered in two letters. About this period he had a stroke of paralysis by which he for a while lost the use of his legs; at the same time he studied intensely devotional works, and his mind became deeply impressed with religious convictions. He was advised by his physicians to seek for diversion in society, as the only means of alleviating his sufferings. To this he reluctantly consented; but he soon allowed himself to be carried too far by his naturally ardent temperament, and his pious sister Jacqueline, who had joined the community of Port Royal, several times thought it necessary to warn him against worldly pleasures. Her entreaties would perhaps have proved unavailing, had it not been for an incident which occurred in Oct. 1654. While driving over the bridge across the Seine at Neuilly, the two forward horses attached to his carriage were precipitated into the river, and it was little less than a miracle that the carriage did not follow them. The shock he then experienced produced an effect upon his nerves and mind, from which he appears to have never entirely recovered, and to the end of his life he was subject to hallucinations and visions. The immediate result of this occurrence was to revive his religious impressions; he withdrew from society, and entered upon a course of self-denial and austerity, which characterized the remaining years of his life. Amid his previous gayeties, however, he had written some of his philosophical works, such as his treatises *De la pesanteur de la masse de l'air* and *De l'équilibre des liqueurs*, which were not published until the year after his death. In 1654 he completed an "arithmetical triangle," by which he aimed at expounding mathematically certain laws connected with bets and games of chance. It was in fact an approach toward the binomial theorem of Newton. After his death 3 treatises of his were published (1665) in which he had laid down the principles of the calculus of probabilities.—For several years Pascal had been acquainted with the Port Royalists, and his new mode of life brought him into closer intimacy with them. They were now the upholders of the doctrines of Jansenius, and though he never formally joined their society, he frequently visited their house, and soon interested himself in their quarrel with the Jesuits. When, at the end of 1655, Antoine Arnauld was expelled from the Sorbonne on account of his letter in defence of Jansenism, Pascal, impelled by motives of friendship, entered the lists and published the first of the series of *Lettres de Louis de Montalte à un provincial de ses amis et aux RR. PP. les Jésuites sur la morale et la politique de ces pères*, which afterward became so celebrated under the abbreviated title of "The Provincial Letters." The first of these letters, which appeared Jan. 23, 1656, was eagerly read and circulated even among those who had until then remained uninterested in the contest. It was followed at intervals by 17 others within a period of 14 months. The replies of the Jesuits, the condemnation of the letters by the holy see in 1657, and the sentence of the council of state and the parliament of Aix that they should be burned by the hand of the executioner, could not check their popularity; and 20 years later, as appears from Mme. de Sévigné's correspondence, the *Petites lettres*, as they were now styled, had lost nothing of their original attractions. They may be said to have been the origin of that hostile feeling which, a century later, brought about the expulsion of the society of Jesus from France. Their circulation in Europe was increased by translations into several languages; and one of the Port Royalists, Nicole, who had been instrumental in their composition, produced a Latin version of them under the name of Wendrock.—In the midst of these labors Pascal's health had continued failing, and his sufferings scarcely left him any respite; he nevertheless returned to his wonted pursuits, and studied the properties of curves, and especially those of the cycloid or *roulette*, which had already arrested the attention of Galileo, Torricelli, Descartes, and Fermat. Pascal completed their researches upon this particular point, and in 1659 published the results of his investigations in his *Traité général de la roulette*. He had also engaged in the composition of a new demonstration of Christianity, in which he was to enlist all the powers of human reason in the service of truth; but the state of his health left him but brief periods for this project. He was able only to write occasionally detached thoughts, which were collected after his death, and published in 1670, under the title of *Pensées sur la religion*. Modern critics, especially Victor Cousin and Ste. Beuve, availing themselves of previously neglected sources of information and original manuscripts too slightly passed over by former editors, have succeeded in giving an outline of Pascal's design. The last 4 years of his life were an almost unbroken series of bodily suffering and charitable employments; his alms absorbed more than his income. His remains were buried in the church of St. Étienne du Mont, where his tomb is still to be seen.—There are two editions of Pascal's complete works, including his scientific treatises, namely, that of Bossut (5 vols. 8vo., 1779), and that of Lefèvre (5 vols. 8vo., 1819). The *Lettres provinciales*, collected for the first time in 1657, were published in 1684 at Cologne under the supervision of Nicole, with Latin, Spanish, and Italian translations. The *Pensées*, which have been of late an especial object of research and study, were reprinted from the original edition of 1670, first in 1672 (2 vols. 12mo.), and with a life of Pascal by his sister, Mme. Périer, in 1684; by Desmolets, with some additions, in 1729; and by Condorcet in 1776. These were the foundation of every subsequent edition, until 1842, when M. Cousin, in a paper read before the French academy, pointed out the alterations and omissions in every one of them, referring at the same time to the autograph manuscript which is preserved in the imperial library at Paris. In 1844 M. Prosper Faugère, following up Cousin's suggestions, issued a more correct edition of the *Pensées, lettres et fragments de Blaise Pascal* (2 vols. 8vo.). This gave rise to a controversy respecting the work itself and what has been styled the scepticism of Pascal, to which we are indebted for the following works among others: Victor Cousin's *Blaise Pascal* (1849); Ste. Beuve's *Port Royal* and *Portraits littéraires;* and the abbé Flottes and A. Vinet's *Études sur Pascal* (1846 and 1848). The controversy has been summed up by Havet in a new edition of the *Pensées* (2 vols. 8vo., 1852). The life of Pascal by Mme. Périer has been the foundation of numerous subsequent biographies. The *Pensées* and *Lettres provinciales* have been several times translated into English.—The younger sister of Pascal above alluded to, JACQUELINE, born in 1625, died in 1661, left some miscellaneous works, letters, and verses, which have been collected by Prosper Faugère (1 vol., Paris, 1845), and by Cousin in his biography of Jacqueline Pascal (Paris, 1849).

PASCHAL II., pope (RANIERI OF BLEDA), born in Tuscany, died in 1118. He was a monk of the order of Cluny, and having been sent to Rome on some affairs of his order was made cardinal by Pope Gregory VII. He succeeded Urban II. in 1099, and almost immediately afterward renewed the struggle with the German emperor on the subject of investitures, which had engrossed so much of the pontificates of his predecessors. He excommunicated Henry IV. in 1102, whereupon that emperor's son revolted and caused himself to be acknowledged as Henry V.; but in the matter of investitures he proved as unyielding as his father. Paschal proposed a compromise, offering to restore all the temporalities which the church had received from secular princes since the time of Constantine, provided the emperor would renounce the right of investiture which was founded upon these grants; but the bishops, especially those of Germany, who were possessed of large fiefs, would not consent to the measure, and when Henry arrived at Rome to be crowned in 1110 the negotiation was broken off, and the pope refused to perform the coronation ceremony. The emperor thereupon seized the pontiff's person, treated him with great indignity, and after keeping him prisoner two months extorted from him a renunciation of the disputed right, received the crown, and went back to Germany. Paschal afterward summoned a council in the church of St. John Lateran, by which the investiture of churchmen by lay hands was solemnly condemned. The result was a rebellion of some of the turbulent German barons, but Henry soon subdued them, and marching upon Rome compelled the pope to flee to Benevento. After the emperor's return, Paschal made vigorous preparations for war, but died before he could take the field. He had also been involved in a dispute with Henry I. of England on the same subject, but a compromise was effected in 1108, whereby the king surrendered an unimportant part of the ceremony of investiture (the collation of the ring and crosier), and retained the right of nominating bishops and abbots and exacting from them fealty and homage.

PASHA, a Turkish governor of a province, or military and naval commander of high rank. The French spell the word *pacha*, and formerly in English it was usually written basha or bashaw. Pashas of the first rank are called pashas of 3 tails, that number of horse tails being carried before them as a standard when they appear in public. Before those of inferior rank two horse tails are borne. The title is probably of Persian origin, and is very ancient, a similar term, *pakha*, being used in the Hebrew Scriptures to designate the viceroys or governors of provinces of the Assyrian, Babylonian, and old Persian empires. The office corresponds to that of the ancient Persian satraps. Until recently the Turkish pashas were entirely absolute in the administration of their provinces, but under the present reformed system the power of these officers is in some measure checked by local councils. The province governed by a pasha is called a pashalic.

PASIPHAË. See Minos.

PASKEVITCH, Ivan Fedorovitch, prince of Warsaw, a Russian field marshal, born in Poltava, May 19, 1782, died in Warsaw, Feb. 1, 1856. He was educated at St. Petersburg, became a page of the emperor Paul, and in 1800 entered the army. He served with distinction in the earlier campaigns of the reign of Alexander I., and in those of 1812–'14 commanded under Bagration, Miloradovitch, Benningsen, and Rayevski, at Smolensk, Moscow, Leipsic, and in France. After his return to Russia he accompanied the grand duke Michael, brother of the emperor, on a journey through various provinces of the empire; and in 1826, on the outbreak of the war against Persia, was appointed by Nicholas to command under Yermoloff. Having achieved considerable successes over the Persians under Abbas Mirza, he in the following year succeeded the less successful Yermoloff in the chief command; and the taking of the fortified Armenian convent of Etchmiadzin, of Nakhitchevan, and other strong places, soon paved the way to the conquest of Erivan, which capitulated in Oct. 1827. For this achievement he was rewarded by Nicholas with the title of Erivanski. Paskevitch now crossed the Aras, and by a rapid advance entered the city of Tabriz, when a peace was concluded with the Persian commander, but it was not ratified until after further operations in the beginning of 1828. The peace of Turkmantchai, which added to Russia Persian Armenia, being concluded Feb. 22, Paskevitch found a new field of military activity in the war against Turkey. He commanded in the East, while the principal Russian army was engaged on the line of the lower Danube and the Balkan. Anapa, Poti, Kars, and Akhaltzik were taken in the summer of that year; and advancing through mountain passes in that of 1829, Paskevitch surprised a large army under the seraskier. Assisted by the treachery of the janizaries, he took Erzroum, July 8, and pushed forward toward Trebizond, in the vicinity of which he received the news of the peace of Adrianople. Made field marshal and governor of the province of Georgia, he checked the rising of the Lesghian mountaineers in 1830, and in the following year, on the death of Diebitsch, was appointed (June 26) his successor as commander-in-chief of the armies employed in Poland. These were at the same time strengthened so as to become overwhelming; and, still deluded by the promises of France, the generals of the revolution allowed Paskevitch to cross the Vistula, unchecked, near the Prussian frontier, and to advance on the right bank of that river toward Warsaw, which after a desperate struggle finally capitulated (Sept. 8). The conqueror received as his reward the title of prince of Warsaw, and was made governor (Russ. and Pol. *namiestnik*, lieutenant or viceroy) of Poland, which was now stripped of its constitutional semi-independence, and transformed into a Russian province, though maintaining some institutions of a separate administration. The task of governing the unhappy country was one of the greatest responsibility; but Paskevitch not only discharged his duty to the entire satisfaction of his master, but by his moderation also gained some popularity among the less revolutionary part of the Polish people. Various attempts at a new rising, among others that of 1846, were speedily suppressed; and the year 1848 passed off without convulsion, the attention of the Poles being chiefly turned toward Hungary, whence the liberation of Poland was expected. To avert the more and more threatening danger, Nicholas, having already attempted an invasion of Hungary from the Danubian principalities in the winter of 1849, in the ensuing spring placed Paskevitch at the head of an army of intervention of more than 200,000 men, which simultaneously crossed the northern, north-western, and south-eastern Carpathians, acting in part independently, and in part in conjunction with the Austrians. No brilliant victory was now achieved by Paskevitch, his principal merit consisting in cautiously avoiding dangers, while the Hungarians, distracted by hostile populations and fortresses within their own territory, were slowly crushed by the weight of converging masses. Görgey's surrender at Világos (Aug. 13) having virtually ended the struggle, Paskevitch returned to Warsaw, where he received new honors from Nicholas. A grand jubilee soon after took place in that city on the 50th anniversary of his entrance into the army. In April, 1854, he once more took the command of the principal Russian army in the war against Turkey, after the first disastrous campaign on the Danube, but soon resigned it, having been wounded before Silistria (June 8), which he failed to conquer, and returned to Poland. His successor in command, Prince Michael Gortchakoff, also succeeded him as governor of that country.

PASQUIER, Étienne, a French jurist and author, born in Paris in 1529, died Aug. 31, 1615. He studied law under Cujas at Toulouse and Marianus Socinus at Bologna, was admitted to the bar, and first appeared in 1549 in the capacity of attorney before the parliament of Paris. He devoted much attention to literature and history, and after publishing the *Mo-*

nophile and *Les colloques d'amour*, in prose, and several miscellaneous poems, he produced in 1561 the 1st book of his *Recherches de la France*. In 1564 he was counsel for the university in its lawsuit with the society of Jesuits. His pleadings made him popular, and clients flocked to him. He witnessed the parliamentary sessions known as *les grands jours* at Poitiers in 1579, and at Troyes in 1583; was in 1585 appointed attorney-general to the court of accounts, and in 1588 was elected a deputy to the states-general at Blois. A faithful adherent of royalty, he accompanied the royalist members of the parliament who, under Henry III., held their sessions at Tours, and returned to Paris with Henry IV. He now found himself involved in new quarrels with the Jesuits, who were expelled from France in consequence of the attempt of Jean Châtel upon the life of the king. In 1604 he resigned his office of attorney-general to his eldest son, and devoted his later years to revising, completing, and publishing his literary works. Most of these were collected and printed in 2 vols. fol. (Amsterdam, 1723). Beside his invaluable *Recherches de la France* in 9 books, which, notwithstanding some errors, are justly regarded as a treasury of learning, they include 22 books of familiar letters, affording ample information upon the manners of the time. M. Léon Feugère has edited his *Œuvres choisies* (2 vols. 18mo., Paris, 1849), with an excellent biographical and critical notice. Pasquier's fame as a jurist has been fully vindicated by the publication of his *Interprétation des Institutes de Justinien*, edited by M. Charles Giraud (4to., Paris, 1847).

PASQUIER, ÉTIENNE DENIS, duke, a French statesman, of the same family with the preceding, born in Paris, April 22, 1767. Before he became of age he was appointed councillor in the parliament of Paris. His father was beheaded during the French revolution, and he himself was incarcerated. Under the empire he became successively master of requests in the council of state, councillor, *procureur général du sceau et des titres*, and prefect of police. Charged by Napoleon with neglect of duty at the time of the conspiracy of Malet in 1812, he was acquitted on trial, and kept in office until the first restoration, when Louis XVIII. appointed him director-general of roads and bridges. He stood aloof during the Hundred Days, and after the second restoration was keeper of the seals and temporarily minister of the interior in the cabinet of Talleyrand in 1815, minister of justice in that of Richelieu in 1817, and of foreign affairs in that of Decazes in 1819. He adhered to the revolution of July, 1830, and was treated with favor by Louis Philippe, who made him president of the chamber of peers, with the honorary title of chancellor of France. He had been made a baron by Napoleon, became a count under the restoration, and finally in 1844 received the title of duke from Louis Philippe. Although he cannot be styled an author, having published nothing but a vaudeville and a collection of discourses delivered in his capacity of minister or peer from 1814 to 1836 (4 vols. 8vo., 1842), he was in 1842 elected a member of the French academy. It is generally reported that he has written interesting *Mémoires* which will be published after his death. The revolution of 1848 terminated his political career.

PASQUIN, the name given to a mutilated statue in Rome, standing at the end of the Braschi palace near the Piazza Navona. In its immediate neighborhood was situated in the latter half of the 15th century the shop of a tailor named Pasquin, or Pasquino, which was much frequented by people of consequence for the purpose of hearing the current gossip and scandal of the town, and of amusing themselves with the facetious stories and satirical remarks of Pasquin and his workmen, to whom the utmost license of speech seems to have been allowed. So many caustic personalities emanated from this place, that gradually every bitter saying was attributed to Pasquin or his shop—a practice the more convenient, as etiquette forbade the sufferer by such libels, or pasquinades as they were called, to exhibit any resentment. After Pasquin's death the statue, which had long lain half imbedded in the ground, was dug out and set up near his shop. The populace, availing itself of this circumstance, declared that Pasquin had come to life again. The mutilated torso was called by the name of the defunct tailor, and thenceforth the custom arose of attaching to it bits of writing of a satirical character, which frequently took the shape of lampoons upon persons in high station, the pope and cardinals being favorite objects of attack. "The free speech," says a recent writer, "which was prohibited and dangerous to the living subjects of the temporal power of the popes, was a privilege which, in spite of prohibition, Pasquin insisted upon exercising. Whatever precautions might be taken, whatever penalties imposed, means were always found, when occasion arose, to affix to the battered marble papers bearing stinging epigrams or satirical verses, which, once read, fastened themselves in the memory, and spread quickly by repetition. He could not be silenced. 'Great sums,' said he one day, in an epigram addressed to Paul III., who was pope from 1534 to 1549, 'great sums were formerly given to poets for singing: how much will you give me, O Paul, to be silent?'" The statue of Marforio, supposed to be that of a river god, which about the close of the 16th century was placed in the *palazzo de' conservatori* on the Capitol, was made the vehicle for replying to the attacks of Pasquin; and other statues in various parts of the city occasionally issued an epigram on public affairs. Pasquin, however, maintained his supremacy over all rivals, and so formidable did he become that Adrian VI. proposed to have him thrown into the Tiber, but was dissuaded by his friend Lodovico Suessano, who declared that the frogs of the river would thenceforth croak pasquinades. The first true pasquinades date from the pontificate of Leo X., and after the lapse of 3½ centuries the statue pursues his ancient avocation with undiminished vigor. Satirical epigrams however were published previous to Leo's accession, and the following, directed against Alexander VI. (Roderic Borgia), is unsurpassed in severity by any utterance of Pasquin:

Vendit Alexander claves, altaria, Christum;
Emerat ille prius, vendere jure potest.

"Alexander sells the keys, the altars, Christ.
He bought them first, and has a right to sell."

PASQUOTANK, a N. E. co. of N. C., bordering on Virginia, and bounded N. E. by the Pasquotank river, and S. by Albemarle sound; area, about 300 sq. m.; pop. in 1860, 8,940, of whom 2,983 were slaves. Its surface is low and level, including a portion of the Dismal swamp, and in some places fertile. The productions in 1850 were 624,575 bushels of Indian corn, 19,436 of wheat, and 22,946 of oats. There were 3 ship yards, 3 newspaper offices, 14 churches, and 640 pupils attending public schools. The Pasquotank river is navigable for small vessels to the capital, Elizabeth City, and a branch of the Dismal Swamp canal crosses the county.

PASSAIC, a N. co. of N. J., bordering on N. Y., bounded S. W. by the Pequannock, and intersected by the Ringwood, Ramapo, and Passaic rivers; area, about 220 sq. m.; pop. in 1860, 29,021. Its surface is diversified and the soil generally fertile. The productions in 1850 were 140,213 bushels of Indian corn, 41,509 of rye, 79,169 of potatoes, 41,446 of oats, 11,025 tons of hay, 5,320 lbs. of wool, and 238,470 lbs. of butter. There were in the latter year 16 grist and 21 saw mills, 1 card, 1 carpet, 4 woollen, and 10 cotton factories, 4 paper mills, 1 rolling mill, 7 forges, 2 founderies, 1 furnace, 2 locomotive manufactories, 27 churches, and 1,157 pupils attending public schools. The Morris canal and New York and Erie railroad intersect the S. E. corner of the county, the latter passing through the capital, Paterson.

PASSAIC, a river of New Jersey, which rises in Mendham, Morris co., flows S. for a few miles and then E. between Somerset and Morris cos., then N. N. E. between the latter and Essex co., crosses Passaic co. in an easterly direction, and turning to the S. after a very devious course of about 90 m. enters Newark bay. It is navigable a short distance for sloops. At Paterson it has a fall of 72 feet (or 50 feet perpendicular), affording immense water power, which has been improved by dams and canals. It is much visited by tourists.

PASSAMAQUODDY BAY, a body of water between the S. E. extremity of Maine and the S. W. corner of New Brunswick, being about 12 m. long and 6 m. wide at the entrance. It receives the waters of the St. Croix and Didgeguash rivers. Campobello island lies across the entrance of the bay, and Deer island and a cluster of small islets called Wolf islands lie within it. The bay is well sheltered and not liable to be obstructed by ice; and it has good harbors and a sufficient depth of water for the largest vessels. It abounds with fish, such as mackerel, cod, and herring. The tide has an average rise of 25 feet.

PASSAU (anc. *Batava Castra*), a town of Bavaria, capital of the circle of Lower Bavaria, situated at the confluence of the Inn and the Danube, 92 m. E. N. E. from Munich; pop. 11,000. It is divided by the rivers into 3 parts, the central one being the town proper, and the others, Innstadt on the Inn, and Ilzstadt on the Danube, being suburbs. The Ilz, a tributary of the Danube, flows between Ilzstadt and Anger. The town is strongly fortified by two formidable castles and 8 smaller works of defence, and constitutes one of the most important strongholds on the Danube. It has a cathedral with some interesting monuments, a public library, a theatre, an old abbey, a bronze statue of King Maximilian Joseph, several schools and hospitals, a lunatic asylum, manufactures of porcelain, leather, tobacco, beer, paper, iron, and copper, and an active trade on the Danube. Its bishops were formerly independent princes, but it was secularized in 1803, and incorporated with Bavaria in 1805. In 1552 a treaty guaranteeing religious freedom to the German Protestants was concluded here between the emperor Charles V. and Maurice of Saxony.

PASSENGER PIGEON, or WILD PIGEON (*ectopistes migratoria*, Swains.), a well known columbine species peculiar to North America, where it exists in immense numbers. The family characters are given under PIGEON; the generic characters are, a very small head, short bill, long wings, the first primary the longest, tarsi very short, and tail very long and wedge-shaped. The male passenger pigeon is about 16½ inches long, with an alar extent of 25; the general color above is grayish blue, some of the wing coverts being marked with black spots; throat, fore neck, breast, and sides light brownish red, and the rest of the under parts white; lower hind neck with golden, green, and violet reflections; quills blackish, bordered with pale bluish, the larger coverts whitish at the tip; 2 middle tail feathers black, the others pale blue at the base, becoming white toward the end; the bill black, iris bright red, and feet carmine purple. The female is smaller, and of duller colors. Their rapid and long continued flight enables them to pass over, and their keen vision to survey, a vast extent of country, when migrating at irregular periods in search of the mast which constitutes their principal food; the flight is high or low according to the unfavorable or promising nature of the region; they present a very beautiful appearance as they perform their aërial evolutions preparatory to alighting, now displaying a brilliant sheet of azure which suddenly changes into rich deep purple; for an account of the rapidity of their flight, see CARRIER PIGEON.

After feeding they settle on the trees to rest, and toward sunset depart for their roosting places, often hundreds of miles distant; they build in forests where the trees are high, without much reference to season, and in places where food is abundant and water not far off; the habits of courtship, incubation, and feeding of the young squabs, are the same as in other pigeons; the flesh is dark-colored, and highly esteemed as food; according to Wilson they lay only one egg, but Audubon says two. This bird is found throughout temperate North America to the high central plains. Their numbers are absolutely countless both in the roosting and breeding places; in the former they spread over thousands of acres in the West, breaking down the limbs of trees with their weight, and destroying the grass and underwood; in these places they are killed by myriads, and by every conceivable kind of weapon and device, from clubs to firearms and sulphur pots. The breeding places are still more extensive; Wilson describes one in Kentucky as extending 40 miles through the woods and several miles wide, every tree bearing nests wherever they could be placed; they appeared about April 10 and left with their young before May 25; when the young were nearly full-grown, the people came, with their families, from all the neighboring country, formed encampments, and commenced the business of collecting the birds; he describes the scene as very exciting, though disgusting, the ground being strewed with felled trees and broken branches, the young birds devoured by hogs below and by hawks and vultures in the air, and the old birds crowding and fluttering with a deafening noise. Notwithstanding the immense destruction, such is their fecundity from the numerous broods in a season, that the numbers do not seem to diminish. Wilson calculates the length of a column of these birds which passed over him at 240 miles, and estimates the number of pigeons in it at more than 2,000,000,000; allowing ½ pint of food for each bird, such a legion would consume daily about 17,500,000 bushels. Nothing comparable to such flights, which actually obscure the sun at noonday, can be seen except in the myriads of locusts in the East. Audubon estimates the numbers at a less amount than Wilson. Though not found in such multitudes in the New England and middle states, great numbers are caught in spring nets in the autumn, keeping the market well supplied, and at a moderate price when the consumer is brought into immediate relation to the captor.

PASSION FLOWER, a showy plant, the type of the natural order *passifloraceæ.* These are herbs or shrubs, usually climbing, seldom erect, with alternate leaves furnished with leafy stipules, and the petioles often glandular; axillary or terminal flowers, often accompanied by a 3-leaved involucre; the sepals 5, of a green color; the petals 5, arising from the throat of the calyx, and colored; within these, several rows of filamentous processes, regarded by some as abortive stamens and by others as the true corolla, but probably an intermediate condition of both; the true stamens 5, monadelphous, rarely indefinite, surrounding the stalk of the ovary; anthers linear, 2-celled, bursting longitudinally; ovary upon a long stalk, superior, 1-celled; styles 3, arising from the same point, clavate; stigmas dilated; seeds attached in several rows to the placenta, with a brittle sculptured testa surrounded by a pulpy aril; cotyledons flat, leafy. The common passion flower (*passiflora cœrulea*, Linn.) is a climbing greenhouse plant from Brazil and Peru, and has been known in cultivation since 1699. Its stem is of a somewhat woody texture, and attains to considerable size; its branches are abundant, long, flexible, and of rapid growth, reaching 15 or 20 feet in a single season. Its leaves are palmate, 5-parted, and entire, the footstalks glandular; the involucre is 3-leaved; the blossoms of a beautiful blue color without and purplish and white within; the filamentous processes of the same color and shorter than the petals; they possess a faint smell, and last for a single day only; the fruit is egg-shaped, of the size of a large plum, yellowish when ripe, and filled with a sweetish unpleasant pulp and black seeds. The racemose passion flower (*P. racemosa*, Sims) is a native of Brazil, having 3-lobed leaves, with 4 glands upon the petiole, and twin pedicels forming terminal racemes in consequence of the upper leaves being abortive; its flowers are of a deep red or scarlet color. Between these two species a showy hybrid has been raised, known as *P. cœruleoracemosa* of Sabine, and described and figured in the "Transactions of the London Horticultural Society," vol. iv., in a highly interesting and scientific paper. The Grenadilla vine (*P. quadrangularis*, Willd.), a native of the West Indies, has a square ligneous stem; oblong-ovate, subcordate, entire, veiny leaves 5 to 6 inches long, petioles with 6 glands, stipules roundish ovate, involucre 3-leaved; the flowers are large, showy, red within, white without, and odoriferous; the fruit large, oblong, about 15 inches in circumference, of a greenish yellow color when ripe, soft and leathery to the touch, and quite smooth, with a very thick skin enclosing a succulent, purple pulp, of a sweet taste, but slightly acid, and in a hot climate cooling and agreeable; the seeds lie in a sort of sac which easily separates from the pulp. In the stove or hothouse this species grows admirably when trained under the rafters of the house, the shoots being pruned back to within 2 or 3 eyes of the old wood, and abundance of water given in the growing season. It has been successfully cultivated in Europe for the sake of its fruit. The winged-stem passion flower (*P. alata*, Willd.), has a 4-angled stem; undivided, cordate, very entire leaves, petioles with 4 glands; flowers large, of a rich crimson; the filamentous processes variegated with blue and purple; blossome superb, and with a pleasant scent. It succeeds admirably when trained in an upright manner at the back of the greenhouse. The serrate-leaved passion flower (*P. serratifolia*, Bot. Mag.) is a species requiring the heat of the stove, a native of Surinam, with undivided ovate-serrate leaves, showy flowers of a purplish color, the processes spotted with purple and blue. The edible passion flower (*P. edulis*, Linn.) has smooth, 3-lobed, serrated leaves, the petiole with 2 glands near the apex, the involucre glandularly serrated, the processes equal in length to the calyx; the petals whitish tinged with purple. It is a native of Brazil, grows rapidly, and is easily raised in the conservatory by training its long flexile branches to the rafters. The fruit has a yellow pulp of a peculiar flavor, esteemed by some. There are a few species which possess a disagreeable odor when the stems or glands are bruised, and which constitute a section by themselves called *dysosmia* by Don. Of these may be mentioned the *P. fœtida* of Cavanilles, having hispid stems and petioles; leaves villous on both sides, 5-nerved, cordate at the base, 3-lobed, nearly entire, lateral lobes very short, the middle ones acuminated; flowers whitish with variegated blue and purple processes. This species occurs in the Caribbean islands and in South America. A more remarkable one is the *P. ciliata* (Aiton), with a round smooth stem, which climbs to a great height; dark green, glossy, perfectly smooth, 3-lobed leaves, beset on the edges with strong glandular hairs; the involucre 3-leaved and capillary, each division terminating in a viscid globule, which is fetid when bruised; flowers small, whitish, with blue filamentous processes. From the tropical species a good many very fine hybrids have originated, of which may be mentioned *P. Kermesina*, *Loudoni*, *Decaisneana*, &c. The last named is a very recent sort, of the style of the *alata*, with leaves 10 inches long, light brilliant green, and of a coriaceous texture; large flowers of a rich crimson, with purple and blue processes.—Of the North American species, the flesh-colored (*P. incarnata*, Linn.) is common in the southern states, blooming in June and July. It has palmately 3-lobed, acute, serrate leaves, biglandular petioles, 2-bracted peduncles, sepals and petals whitish within, processes in 5 rows of a purplish pink color; fruit yellowish. It is a perennial herbaceous species, making strong shoots in a single summer, and well adapted to cover trellises in small gardens. The yellow-flowered (*P. lutea*, Linn.) has cordate leaves broadly 3-lobed at the summit, with the lobes round and entire, glandless petioles, small yellowish green flowers, and oval purple fruit; it occurs in woodlands and thickets from Ohio to Florida. The *P. suberosa* (Linn.) has smooth leaves, slightly fringed on the margins, 5-nerved at base, divided above the middle into 3 ovate, entire, acute lobes, the middle largest; petioles short, 2-glandular; flowers and sepals greenish, petals none, processes purple at base, fruit purple; it occurs in Florida. The narrow-leaved (*P. angustifolia*, Swartz) has leaves either entire or 3-lobed, the upper ones simple, lanceolate, and acute; the flowers are small, solitary or by pairs, yellowish, processes in 2 rows; fruit purple and of the size of a pea. Another species, the *P. Warei* of Nuttall, has very small flowers with a very few processes; it occurs in S. Florida, and may be a variety of *P. pallida* of the West Indies. (Chapman, in "Flora of the Southern United States," New York, 1860.)—The *passifloræ* are American species exclusively, generally occurring within or near the tropics. Although, as has been noticed, the fruits of some are edible, yet those of others are noxious and disagreeable. The prevailing quality of the genus is narcotic. The root of the Granadilla is likewise an emetic, and from the flowers of the *P. rubra* a tincture is prepared as a substitute for opium; the flowers of the *P. fœtida* are pectoral and employed in hysteria, its leaves are emollient and narcotic, and emmenagogue qualities are ascribed to the root of the plant. The aril of the seeds of some of the edible-fruited species is in some instances sweet, and in others acid and useful for compounding a cooling drink in fevers and in bilious disorders. The flowers were supposed to represent the sufferings or "passion" of the Redeemer, and in them the Spanish monks supposed they saw the figures of the implements, wounds, and crown of thorns; the trivial name thus early applied by them has been retained, affixed to a blossom which seems rather to present in its evanescence and rays of glory the type of human life.—Of the true passion flowers Don gives at least 185 species and varieties, beside mentioning many allied genera. The several kinds are easy of cultivation from seeds, suckers, or cuttings; the last should be from the extremities of the branches, and struck in a gentle heat. The soil they prefer is a light rich mould.

PASSION WEEK, in the church of England, the week before Easter, corresponding to Holy Week in the Roman Catholic church. See HOLY WEEK.

PASSOVER (Heb. *pesaḥ*, from *pasaḥ*, to leap over, to pass by; Aram. *pasha*; Sept. *πάσχα*; Vul. *pascha*), a Hebrew festival, instituted by Moses in commemoration of the Israelites remaining intact on the night of the destruction of the first born in Egypt, immediately preceding the exodus from that country (Ex. xii.). Originally it was observed by sacrificing passover lambs toward the evening of the 14th of the 1st Hebrew spring month (now Nisan), and eating them on the following night, as well as by excluding all leaven from the meals of that evening and the following 7 days, the first and last of which were observed as holy. Since the final destruction of the temple of Jerusalem, the passover has been celebrated by eating unleavened bread during the 7 (out of Palestine during 8) days, by abstinence from labor on the first and last (out of Palestine on the first two and last two), and by the observance on the first evening (out of Palestine on the first and second) of various domestic rites commemorative of the deliverance from Egyptian bondage, including the recital of scriptural and legendary narratives and familiar conversation on the same national event, and the chanting of psalms.

PASSOW, Franz Ludwig Karl Friedrich, a German philologist, born in Ludwigslust, Sept. 20, 1786, died in Breslau, March 11, 1833. He was educated at the gymnasium of Gotha and at the university of Leipsic, where he studied theology and philology. In 1807 he became professor of the Greek language in the gymnasium at Weimar, and in 1810 director of the institution styled the Conradinum at Jenkau near Dantzic. After the dissolution of this institution in 1814 he was made professor of ancient literature in the university of Breslau and director of the philological seminary. Of his philological works, the most important is the "Dictionary of the Greek Language" (2 vols., 4th ed., Leipsic, 1831), still one of the most useful of Greek dictionaries.

PASSPORT, a document given by the authorized officer of a state, which permits a person or persons therein named to pass or travel either generally, or through a country named, or on certain routes, by land or water. Passports must have been used by all civilized governments to some extent and in some form; but in England and in the United States they have not been used within those countries, though their governments give them to those of their citizens who purpose to travel abroad. Each of the United States will give its passport to any of its citizens, and so will the government of the United States. The U. S. secretary of state is charged with the duty of issuing passports, and authorizing and regulating their issue by diplomatic or consular agents. Any one who issues a passport without authority, or who has authority and issues a passport to one not a citizen, is liable to punishment by fine and imprisonment. Passports are also given by collectors of ports to all vessels of the United States, and if any such vessel sails without a passport the master is liable to a fine of $200. One entitled to a passport may address a request to the office of the secretary of state, at Washington, and will be furnished with directions how to transmit the necessary statements and evidence; or he may, generally, learn all that is necessary from a collector of a port, or from a public notary. Every passport states the name, age, residence, and occupation of the holder, with a description of his person and appearance, which is intended to afford the means of identifying him. It is supposed to assure the holder of the support of his own government, and asks for him and entitles him to the protection of all governments or nations at peace with his own.—The rules and usages, in Europe, in respect to personal passports, differ almost indefinitely. In general, the bearer should take his passport to the minister or authorized agent of the country which he is about to visit, and have it signed by him; and on arriving at the outposts or frontier ports or cities of any foreign state on the continent of Europe, the passport must be exhibited, and so it must be at any principal town in the interior in which it is intended to remain for any considerable period. In many of the European states, a native citizen or subject cannot travel many miles in his own country without a passport. The whole system is productive of great annoyance and some expense to travellers. It has been kept up to afford the authorities means of surveillance over suspicious characters, and thereby to prevent conspiracies against the government, or provide the means of detecting them. The belief that passports have little efficacy for this purpose has been confirmed by recent experience; and the growing conviction that they are not so useful as they are inconvenient and oppressive, may have been the inducement for a recent change in the system in France, where it formerly flourished in full vigor, but where from the recent declaration of the emperor (Jan. 7, 1861) it is about to be relaxed in favor of English visitors to that country.

PASTA, Giuditta, an Italian singer of Jewish origin, born at Saronno, near Milan, in 1798. She received her first musical education from Bartolommeo Leotti, chapelmaster in the cathedral of Como. At the age of 15 she was admitted to the musical conservatory of Milan, where she was by no means a distinguished scholar, and in 1815 began her public career at the minor theatres in Leghorn, Parma, and Brescia. The next year, appearing at the Italiens in Paris, she failed to attract notice; she was equally unsuccessful in London, and decided upon returning to her native country to study further her profession. This she did in earnest; and when, in 1819 and 1820, she appeared in Venice and Milan, she was greeted with applause. Returning to Paris in 1821, and visiting Verona during the session of the European congress in 1822, she was remarkably successful. Her triumph in London was scarcely less brilliant, and for several years she continued to sing alternately in Paris and London. In 1827, some business difficulty having occurred between her and Rossini, then director of the Italian opera in Paris, she left France and accepted an engagement at Naples, where Pacini composed for her his opera of *Niobe*. Her dramatic powers however did not please the Neapolitans, though they were afterward fully appreciated at Bologna, Milan, Trieste, and Verona. It was at Milan that Bellini wrote for her *La sonnambula* and *Norma*. Pasta won her last triumphs at Vienna in 1832. Her voice, which had always been more remarkable for energetic than melodious qualities, was now impaired; and her last engagement on the Italian stage in Paris, in 1833 and 1834, was not on the whole successful, though she was much admired in Bellini's *Anna Bolena*, Rossini's *Otello*, and Zingarelli's *Romeo e Giulietta*. In 1836 she retired to her villa on the banks of the lake of Como, occasionally passing some time at Genoa and Milan, where she took pleasure in instructing pupils, among whom was Teresa Parodi. Her last engagement, by which she made $40,000, was with the opera in St. Petersburg in 1840.

PASTEL (Lat. *pastillus*), a colored crayon formed by the mixture of color with a colorless base. It is reduced by an application of gum water to the consistence of a paste (whence the name), which is cut into short sticks, and when dry is ready for use. Pastel painting is executed upon a paper manufactured for the purpose, the woolly surface of which assists in blending and retaining the tints. Sometimes vellum with the surface brought to a nap by friction is employed. The artist usually rubs in the tints with his finger, although for the finer kinds of work he also uses the stump or the point of the crayon. The art originated in Germany, but has been cultivated with most success in France by Greuze, Nattier, Girodet, and others.

PASTILLE. See PERFUME.

PATAGONIA, an extensive region of South America, occupying the S. extremity of the continent, bounded N. by the Argentine confederation, from which it is divided by the Rio Negro, E. by the Atlantic ocean, S. by the strait of Magellan, which separates it from Terra del Fuego, and W. by the Pacific as far as lat. 42° S., and thence for about 100 m. by Chili, the Chilian Andes forming the boundary line. It extends from lat. 38° 30′ to 53° S., and from long. 62° 55′ to 75° 40′ W.; extreme length 1,030 m., breadth 420 m.; area 315,000 sq. m.; pop. estimated at 120,000. The country comprehended within these limits is little known, and at present of but little importance. The whole of the coast has been examined by different navigators. There are several bays upon the Atlantic side, but they are not of much use to large vessels. On the N. part of the coast the tides rise about 30 feet, increasing to 50 feet toward the S. The Pacific coast is fronted by a chain of large islands which extend from the W. extremity of the strait of Magellan to lat. 42° S. The chief of these islands are Chiloe, the Chonos archipelago, Wellington, Queen Adelaide's archipelago, and Desolation island. They are all rocky and high, rising abruptly from the shores. The coasts next the Pacific are bare, being subject to frequent storms; but on the opposite side they are wooded, and in some places the timber is of large size. The general aspect of the Pacific coast is rugged and mountainous, broken by inlets and bays, and bordered by rocks and breakers.—Patagonia comprises two regions separated by the Andes, and entirely different both in climate and surface. E. Patagonia consists of a succession of shingly, horizontal plains, called pampas, which rise in terraces from the ocean to the foot of the Andes, where the last attains a height of about 3,000 feet above the level of the sea. The chief rivers in this tract have their source in the Andes, and generally run in a S. E. direction to the Atlantic. Some of them are deep and rapid, and have courses of considerable length, but only a few of the more northern have any effect in fertilizing the land upon their banks. The plains are dreary and sterile, and strewn with huge bowlders. In the S. there is a great deposit of tertiary strata, covered with a thick stratum of a white pumaceous substance containing a tenth part of marine infusoria, which extends for several hundred miles along the coast. This is covered with a bed of shingle 700 m. long, 200 m. broad, and 50 feet thick. The pebbles forming this bed are chiefly porphyry, and have become detached from the rocks of the Andes and water-worn since the deposition of the tertiary strata. Fresh water is exceedingly scarce, but there are numerous salt water ponds. To the N. of lat. 45° S. the country is not so completely barren as the S. portion; it becomes more undulating, and here and there are found good pastures and some trees. The climate is exceedingly cold in winter and hot in summer, and is remarkable for its dryness, no rain falling for about ¾ of the year.—W. Patagonia is wholly mountainous, and in every respect forms a strong contrast to the E. region. The mountains are barren and rugged near the coast, but the E. sides are well wooded. Opposite the island of Chiloe there are two active volcanoes. Heavy rains fall almost incessantly, accompanied by storms of wind, and there is so much bad weather that this portion of the country is nearly uninhabitable. The forests of the W. contain several species of beech and large ferns; and the vegetation of the N. part of E. Patagonia, near the Rio Negro, is the same as that of the Argentine republic. Where there is vegetation, particularly in the N. and W., different kinds of animals are found. Large herds of guanacos, wild cattle, the puma, the wolf, the fox, the opossum, the cavy, and the armadillo are met with. Fish and sea animals are abundant on the coasts; and sea fowl are exceedingly numerous. The condor, hawk, a species of ibis, and the South American ostrich are the principal land birds.—The Patagonians are a tall race, but by no means so large as they were described by early travellers. Their bodies are bulky, but their limbs are not large in proportion. Mr. Bourne, mate of an American vessel, who was in captivity among them in 1849–'50, describes them as about 6½ feet in height, while some few are still higher. Their shoulders are broad, and their chests well developed, their heads and features large, but their hands and feet comparatively small. They are naturally indolent, but when sufficiently aroused exhibit great strength. Their color is a reddish brown, and their hair black, coarse, and lank. They have large mouths with thick lips, but good teeth. They color their faces and bodies with white, blue, or red paint. The hair, tied above their temples with a fillet of twisted sinews, is the only covering for the head; and they wear a large mantle, made of skins sewed together, hanging loosely from their shoulders to their ankles, which adds greatly to their apparently gigantic size. For their feet they make boots out of the skins of horses' hind legs. The stature, dress, and appearance of the women so much resemble those of the men, that were it not for the hair, which they plait in two tails, it would be difficult for a stranger to distinguish them. They are generally good-natured, but when excited are passionate and reckless. They appear to possess nothing like towns, and to lead a wandering and unsettled life. Their huts are formed of a few sticks covered with the skins of animals. Their arms consist of a long lance, a bow and arrows, a knife if it can be procured, and balls made fast to the ends of a long leather thong, which they throw with a rotary motion and use for entangling the legs of animals. They are all expert horsemen. There are several distinct nations in different parts of the country, and those who inhabit the W. coast are of much lower stature than the others. Their chief subsistence consists of the flesh of horses, guanacos, and such other animals as they can capture. They are filthy in their habits, exceedingly vain, and great liars.—Magalhaens is generally supposed to have been the original discoverer of the S. coast of Patagonia. Other navigators, whose names deserve to be mentioned as connected with the discoveries upon its coasts and in the seas adjoining, are Drake, Le Maire, Davies, Cavendish, Hawkins, Cook, Sarmiento, Narborough, Cordova, Byron, Willis, Carteret, Bougainville, Weddell, King, Stokes, and Fitzroy. Many attempts have been made to form settlements upon the coasts and on the neighboring islands, but until lately none of them met with any success. The government of Chili claim the W. part of Patagonia, and the Argentine republic the E. side. The Chilenos have lately formed a few small establishments, extending as far as the E. entrance of the straits of Magellan, and are making efforts to explore the interior.

PATAPSCO, a river which rises in Carroll co., Md., flows southward and then south-easterly between Baltimore and Anne Arundel counties, and passing Baltimore opens into a broad estuary which enters Chesapeake bay 14 m. below the city. Its total length is about 80 m., and it affords valuable water power. It is navigable for large vessels to Baltimore.

PATENTS, Law of. Nothing like the law of patents was known to the ancients, or is now known out of Europe and America. Even there it is comparatively recent. In England it is but little more than two centuries old. In France, the earliest law in favor of new inventions was passed in 1790; and in the United States the system of patent law rests, not on common law, or usage or any reference to natural right, but only upon the statute of 1793 and those which have been made subsequently in amendment or alteration of that, the latest of which was approved March 2, 1861. Indeed, there seems to be now no recognition by courts of any abstract right in an inventor to the exclusive use of his own invention. The theory of the patent law is rather that of contract; the inventor bargains with the public that he will tell them how to do some new work, or some old work in a new way, which shall be useful to them; and they bargain with him that whoever makes use of it for a certain time shall pay him therefor. The purpose of the patent law is to encourage invention for the public good, by the stimulus of the large rewards which a monopoly of any useful instrument must yield. As all our patent laws rest upon express statute law, it might seem as if no consideration of its theory, purpose, or foundation could affect the rights or obligations or remedies of any persons. It may however be very important as bearing upon the question of construction. Patent cases abound with questions, sometimes of very great importance, which may be decided either way in conformity with unquestionable principles and arguments of great weight; and those will seem to be the better principles or the stronger arguments which concur with the presumption adopted, either that a patentee is a monopolist, who owes all his rights to exceptional law, and must be jealously watched, or as a public benefactor, who is to be kindly and tenderly treated. Formerly, in England, the first of these suppositions seemed to be generally made, and a patentee was treated with extreme severity; now, he is there treated more liberally. In the United States, also, whatever may have been the language of the courts in some cases, a patent was seldom permitted to stand, if any ingenuity could detect a flaw. In consequence of the severity of some of the rules of the courts, various statutory provisions were made, as for disclaimer, surrender and renewal, previous use, &c., of all which we shall speak presently. Now, however, we would observe, that while the courts generally adopt a course far more favorable than formerly to the patentee, there scarcely seems as yet a universal recognition of what should undoubtedly be regarded as the true principle, namely, that both parties should be treated rationally and justly and impartially.—In no other country are inventions and patents for inventions so numerous as in this; and our statutes provide liberally and wisely for all those things which may tend to give encouragement and assistance to useful inventors. The patent office is a branch of the interior department; it has a commissioner with a large staff, and three examiners in chief, all well paid, among whom the duties of the office are skilfully divided. A library of such works of science or art as might be useful, is kept in the office; and there is a careful and well devised arrangement of all the models gathered since the destruction of the former patent building on Dec. 15, 1836. To secure the impartiality of the persons employed in the office, they are all prohibited from having or receiving any interest in any patent whatever, other than what may come to them by inheritance. I. *Who may have letters patent?* The statute says: "Any citizen or citizens, alien or aliens having resided one year in the United States, and taken the oath of his or their intention to become a citizen or citizens." They must be the inventors or discoverers of the thing, and not merely introducers of it into this country. If the applicant for an American patent has already, as the inventor thereof, a patent for the same thing in a foreign country, his patent when taken out here will expire as soon as it would if the date of the American patent were the same as that of the previous foreign patent; in other words, it is taken out for 14 years from the date of the foreign patent. Nor can a patent issue in this country for an article patented abroad, if that article has been introduced into common and public use here previous to the application for the patent. It may be remarked, that it is a very common thing for an American inventor to take out a patent in foreign countries, particularly in England and France. If the inventor is dead, the patent may issue to his legal representatives; if he has assigned it, it may issue to his assignees; but none are his assignees but they who receive the whole of his interest. If he reserves any part it cannot be issued jointly to him and his assignees; but if he has more than one assignee, it may issue to all the assignees jointly. II. *What may be the subject of patent?* In the language of the statute, "any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement on any art, machine, manufacture, or composition of matter." There is scarcely a word in this description that has not been criticized and discussed again and again. 1. It must be new. Here some distinction appears to be made in regard to a previous knowledge when the thing is foreign and when it is domestic. If what is claimed as new was distinctly known to some person abroad, but was never patented there, nor published, nor distinctly described in any work, it is new enough to be patented here; but if it was previously distinctly known by any one at home, it is not new in the sense of the patent law, although he who knew it may never have published it in any way. It must be remembered, however, as a very important rule, that a mere previous conjecture, supposition, or conception is not enough to prevent or defeat a patent. It must have been definitely known and reduced to form, or distinctly manifested in some way. Mere thinking about it, or talking about it, is not enough to prevent a subsequent inventor from getting out a patent. The question is: Was it previously described in writing, with drawings or models if they were necessary? There is some disposition to adopt a rule which is certainly reasonable, and applicable without much difficulty, viz.: that a patent shall not be defeated because the thing was previously invented, unless the previous inventor had done enough to entitle himself to a patent; and this would imply that he had reduced the invention so distinctly into form, that a mechanic of reasonable skill might, from his description and without further invention, make the thing patented. Again, it is no defeasance of a patent, that some one, claiming to be a previous inventor, had communicated to the patentee suggestions or plans which were in fact the essential features of the thing patented, and about which the rest had grown, provided the patentee invented and first applied those needed accessories and first constructed the whole thing. It is of no consequence whether the thing was discovered by accident, and at once, or was the result of long, careful, and assiduous labor. Nor is it of moment whether the patentee discovered the whole thing and all its parts himself; for if some parts are old and well known, and others suggested by different individuals, until perhaps there is no one element newly discovered, yet if the whole, in its present form, construction, and action, is new, and is the invention of the patentee, that is quite sufficient. The patent would not be given, or if given it would be void, if the applicant, before his application, has himself abandoned the thing to the public, which will be presumed if "it has been, with his consent and allowance, more than two years in public use or on sale." But his own use of the thing previously will not prevent him from having a valid patent. The statute says that the thing must not be previously "known or used by others;" but it is held that this plural word has also a singular meaning, and if it was known or used by one other, the patent is invalid. 2. In regard to the word "useful," it is perhaps enough to say, that any degree of utility is sufficient to satisfy the statute; and we suppose that very few patents are withheld merely because of the inutility of the thing to be patented, if there be no other objection. 3. It has been questioned what the word "manufacture" covers. In England, what is called the statute of monopolies (21 James I., ch. 3), which was intended and has operated to prevent the ancient oppressive monopolies, permits letters patent (under which monopolies had formerly been granted) still to issue for the "working or making of any new manufactures within this realm." It is under this statute that all letters patent are now issued in England; and to enable them to cover all suitable cases, the word manufactures is construed to mean every thing in the making or preparing of which man makes any use of his hand, that is, of physical power, in any way whatever. The meaning of the word by our adjudication is not quite so broad, because our statute contains other words. There is indeed scarcely any thing which man can do, or invent, which will not come under some of these words; but it is sometimes necessary to determine to which class the thing patented belongs. 4. A "machine" must not be a mere function, or effect, or operation, but it must be a function clothed and embodied in mechanism intended for and operative of a certain effect. If this effect is new, the mechanism which produces it may be old or new. That is, the inventor may have a patent for new mechanism by which he produces a new effect, or for mechanism no part of which is new, if the whole machine, as he constructs it, produces an effect unknown before. It is to be remembered, however, that the mere using of an old machine to do a thing which it had not been used for before, but like what it had been used for, is not the proper subject of a patent. Thus, to use an illustration of this rule given in one case, a man may not observe that a certain mill grinds corn and beans very well, and then take out a patent for it as a coffee mill because he was the first that ever thought to put that mill to that use. But he may have a patent for his coffee mill, although every thing in it has been used before, and although something like it has been used for some grinding, if the same thing has not been applied to do work of the same nature. In stating, and in endeavoring to illustrate such a rule as this, we are reminded of a phrase Judge Story used often to apply to the patent law. He called it "the metaphysics of the law." Many of its distinctions are slight and almost evanescent, and many of its principles scarcely capable of distinct definition; and yet these distinctions and principles are of very great practical importance. 5. Thus, where the patent is not for any new machine, but for "an improvement" in an old machine, which is a very frequent subject of patents, the question, whether it is a lawful improvement or a mere infringement, is sometimes one of the utmost difficulty. We must content ourselves with saying, that if this improvement consists in producing an old effect in a new way, the practical questions are: 1st. Is the effect produced in a way which is actually and substantially different from the old way? for otherwise it is a mere repetition, and may be a mere device to avoid the old patent. 2d. If the same thing be done in a new way, is it done in a better way? because otherwise it is no improvement. Here, as was said of the utility of an invention, the improvement need not be very great; and in general, if the thing be done really in a new way, a patent will usually be granted and protected, unless it seem to be a mere variation or change, of no value excepting because it may invalidate a former patent. For scarcely any thing was ever invented, or perhaps ever will be, that does not suggest at once a multitude of possibilities for doing the same kind of thing; and it is therefore very rare for any new discovery of importance, whether scientific or practical, not to be followed up by a host of those who may not perhaps be called imitators, but who certainly would never have done what they did, had not the way been opened and indicated by the earlier discovery. The difference between the old and the new may to all appearance be very slight, and yet be of great importance. This may be well illustrated by the process of water-proofing cloths, as it was called. Many years ago some one found that cloths immersed in a solution of soap and alum were made water-proof. Then a man took out a patent for immersing cloths first in a solution of alum (with an ingredient or two added), and afterward in a solution of soap; and this patent was sustained, because it was proved that the immersion into the separate solutions successively made the cloth much more completely and permanently water-proof. 6. Another rule, of very frequent application, is that no mere principle can be the subject of a patent; nor can any mere effect; nor can any property of matter or mere quality or power or activity of nature. All this constitutes but one rule; and this might perhaps be expressed by saying that nothing in the abstract can be the subject of a patent. Any of these things, however, in the concrete, can be patented; by this is meant any principle or property which is fixed and embodied in certain mechanism, which then, by means of this principle or power, produces a certain effect. But then it is not so much the principle or power in the mechanism which is patented, but the whole together; nor is the effect alone patented, but the effect when produced by these means in this way. The reasons of this rule are many. One is the almost inevitable indistinctness which would attach to such a patent. Another is, that were the rule otherwise, things might be appropriated and monopolized, which are in themselves universal and the common property of all men. If a mere principle is discovered, even if it be of the utmost importance, such for example as the principle of gravitation, this takes its place at once in science. The discoverer cannot be repaid excepting by the homage rendered to one who has laid all mankind under obligation, by giving to them new truth. But either he or any other man may at once devise and put in operation means by which a new scientific truth or a newly discovered principle is made to operate some practical benefit. Then, as has been said, the principle has become a process. Then this principle with this mechanism as its instrument, and a certain result as its effect, form one legal entity, and that is the subject of a patent. But this patent gives no exclusive right to use this principle or this property, or to produce this effect. Therefore any one who finds out another useful application of the principle or property, or other means by which it may produce this same effect, is also an inventor or discoverer of a new thing, for which he may have his patent. Hence arises what may be considered as the third reason for the rule above stated; it is, that but for it the extent of a patent might be enormous and intolerable. The owner of it might say: "The whole of this principle or power is mine, and that effect is mine however produced." But as the law stands, the principle or property is his only so far as he has fastened it to his own machinery; and the effect is his only so far as he reaches it through instruments of his own invention. No man can acquire exclusive property in the electric fluid, nor can he in any one of its properties or powers. So no man can become the owner of the sun's light, nor of that actinic power by which pictures are painted or impressed. But he may devise any way of working with electricity, and that way shall be his; and so he may discover any way of making pictures or representations by light, and that way also shall belong to the inventor. And then any other person is at liberty to discover some other way of using either of these forces or qualities of nature. But one thing always remains; and that is, the watchfulness of the law to guard an honest patentee from invasion of his rights by a mere colorable pretext of a variation in the method discovered by him of using a certain power in a certain way for a certain end. No better rule can be given than that each patent holds all that belongs to its substance; and any thing is an infringement which does not differ from it materially and substantially. 7. The last phrase used in designating the subject matters of patent, is "composition of matter." This will require but little discussion. It is usually applied to medicines, and less frequently to compositions used in the arts, as for example alloys for the bearings of axles. Here it is obvious that the test question must be, not whether the materials are new, but whether the combination is new. Hence an applicant for a patent for a new composition of matter may use various ingredients, and declare that one as well as the other will answer his purpose, provided that the combination, whatever be used, has in it the element of unity, so far that it is one in its purpose and its effect. 8. By a more recent act (1842) another class of objects may be the subject of a patent, viz.: designs for manufactures of any kind. Some of these might seem to be more properly within the scope of the law of copyright. But for any design, or pattern, or drawing, or print, or picture, which is intended not to have value by itself, but to be used in the manufacture of something else, or to be fastened in any way to some article of manufacture, and be sold with it, the inventor may have letters patent. III. *How Letters Patent may be obtained.* 1. The first step is an application. This must be in writing, addressed to the commissioner of patents, and signed by the original inventor. Even if he have assigned the invention, and the patent is to be made out in the name of the assignee, the application must be signed by the inventor. If he be dead, it must be signed by his executor or administrator. There is no special form required, but it must state distinctly, although generally, what he considers the invention or discovery for which he asks a patent; but no mere mistake in the application will vitiate the patent. By a rule of the patent office, no patent issues for more than one machine, although two or more may be used jointly; and in that case each must be made the subject of a separate patent, although the petitioner may express his desire for both in one application; but it would be better in all respects to treat each machine, from the beginning, as a separate thing, if it be so in fact. With the application he sends to the commissioner a specification of his claim. There must be drawings attached and referred to if these are necessary to understand the specification, and these should be in duplicate, that one copy may be retained in the patent office. Also a model is required wherever that is the best way of illustrating the specification, and a working model is preferable; but no model should be more than one foot in length or height, unless by permission of the commissioner, which is never given but for special reasons. By the 11th section of the recent statute, letters patent may be obtained for any new and original design for a manufacture, or for a bust or bass-relief, or composition in alto or basso-rilievo, or impression or ornament to be placed on any article of manufacture, or any new and useful pattern or print or picture to be fixed on any article of manufacture, or any new and original shape or configuration of any article of manufacture. The exact force and meaning of these phrases will not be known until they are determined by adjudication. It may be added, that the same section provides that the patent may issue on any of these things for 3½ years, 7 years, or 14 years, as the applicant may choose; the fee in each case being respectively $10, $15, or $30, and to all foreigners $300. Money should be deposited with some assistant treasurer, and his certificate taken in duplicate, one copy to be sent on; or the money may be sent through the mail. The applications received are examined in the order in which they come, unless some one is taken up out of its turn for special reasons. If the claim be allowed, a patent will issue and be sent according to the direction of the patentee. If it be rejected, the claimants will always be furnished by the commissioner with the reasons for rejection, and with such references to former patents, or other similar means of information, as will enable the claimant to judge of the sufficiency of the grounds of rejection and of the probability of a successful appeal. 2. It sometimes happens that two or more persons claim each to be the first inventor of the same thing. Then the commissioner declares a case of "interference" to exist, and after due notice to the parties, they are heard in support of their several claims. This may happen although one of the claimants has received a patent at some time before; for the commissioner, if he comes to the conclusion that the second claimant has a better right, or an equal right, will give him also a patent, and leave the two to determine by legal measures which is valid. 3. In all the questions which thus come before the commissioner, or the examiners, on the question of granting a patent, or before any court subsequently in a suit for infringement of the patent, the specification is of the utmost importance. Upon its clearness, its accuracy, its exactness in defining its claim and in claiming what should be claimed and nothing more, a very large proportion of the cases tried depend. The points to be observed are those indicated in the 6th section of the statute of 1836. They are in substance: 1st, that the description shall be so full, clear, and exact, without prolixity, as to enable any person skilled in the art or science to which the thing belongs or with which it is connected, to make and use the same; 2d, that the principle shall be fully explained, "and the several modes in which he has contemplated the application of that principle or character by which it may be distinguished from other inventions;" and 3d, he must specify and point out the part, the improvement, or the combination which he claims as his own. This last requirement is so important, that it has given the name of "specification" to the whole description. All this may seem, to those who have not tried it, very easy; but nothing is more difficult. Mistakes of importance are not unfrequently made by those who are trained to this work, and who make it their special business; and it can very seldom, if ever, be safe for any claimant to draw his own specification, unless he has large experience in work of this kind. Mistakes are not so fatal now as they were formerly, because recent legislation has interposed, wisely as well as kindly, to assist the patentee. If a patent is void by reason of a defective specification, or because the patentee claimed as his own invention more than he had a right to claim as new, he may surrender his patent to the commissioner, and file with him a new and corrected specification, and the commissioner may thereupon issue to him a new patent. Or, by a still later provision, the patentee may make a disclaimer in writing of such parts of the thing patented as he shall not wish to claim; and this disclaimer, being duly received and recorded, shall have the same effect as if it had been originally a part of such specification. Even without such surrender or disclaimer, a patent may still be sustained by the court, for any material and distinguishable part for which the claim was valid, although there are other parts of the claim to which the patentee is not entitled; but he can recover no costs for the infringement of such a patent without surrender or disclaimer. 4. There is a very wise provision to meet the frequent case where an inventor wishes to secure his right, but is not ready to present a full and complete specification, and needs time for experimenting, or other purposes. He may file a *caveat*, which will be placed in the secret archives of the patent office; and if there be any application within a year for any thing which appears to interfere with his claim, he shall have notice and may appear and prove priority; and by paying a second caveat fee ($20), he may renew it for another year, and so on successively. It is to be noticed, however, that a caveat cannot be filed by an alien, unless he has resided in the United States one year, and has made oath of his intention to become a citizen, according to law. Even where caveats are not taken out, all pending applications are regarded as so far confidential, that, until after a patent is issued, no information will be given to any one but the claimant respecting the existence of any application, or any questions which may have arisen in relation to it. 5. To guard against deception of the public as to what inventions are protected by patent, any person who shall, in any way whatever, put any word or remark upon a thing not patented which shall indicate that it is the subject of a patent, or put upon it the name of any patentee without his consent, or, if it be patented, fail to stamp or engrave on the article the fact and date of the patent, is liable to a heavy penalty. 6. The terms of patents for designs may be extended for 7 years from their expiration. Formerly the terms of all patents might be extended under certain restrictions, and the rules and provisions on this subject were minute and complicated. It was thought, however, that they did not suffice to prevent mischief from improper extensions, or from favoritism or mistake in discriminating between applicants for extension, and by the patent law of March, 1861, the whole law of extension, with the above named exception, was abolished as to patents thereafter granted; but the provisions of the preceding law as to extension would seem to remain in force as to all patents previously granted. IV. *Rights and Remedies of Patentees.* So long as the patent remains in force, it gives to the patentee an exclusive right to "make, use, and sell" the thing patented. Whoever infringes on this right is liable in damages, and the infringement may be stopped by injunction. We will consider first what is an infringement of a patent, and then what are the remedies for an infringement. 1. The statute contains no definition; but it has been well said, that an infringement exists when a copy is made agreeing with the principle and action laid down in the specification. Infringements therefore may be of as many kinds as patents are. Perhaps it is impossible to give rules and definitions which shall meet all this variety of cases and be of much use in determining the question of infringement. It is certain, however, that a patentee is seldom permitted to call that an infringement which imitates nothing that is directly and explicitly stated in the specification. For if the patentee did not know this or have it in his mind, he cannot claim it as his; and if he knew it and did not state it, whether through negligence or design, he has failed to lay the foundation of his exclusive right, because he has not placed on record a full, clear, and explicit description of his invention. Perhaps the difficulty attending this law of infringement, and the principles invoked to dispose of it, may be well illustrated by reference to a recent English case which has gone through the courts there and been the subject of much discussion. One Heath invented and patented an important improvement in making steel. This invention consisted in putting into a crucible with pieces of iron carburet of manganese, and exposing the mixture to intense heat. But carburet of manganese is a very expensive chemical product; and one Unwin discovered that by putting into the crucible with the iron oxide of manganese and coal tar, the intense heat to which they were exposed made a carburet of manganese in the crucible, which then operated on the iron in the same way as if this compound had been put there at the beginning; and as oxide of manganese and coal tar are very cheap, Unwin's way was likely to supersede Heath's, who brought an action for damages. The case was tried before Mr. Justice Cresswell, who ruled that there was no infringement. It was then argued before 6 judges in the exchequer chamber, 2 of whom agreed with Cresswell, and the other 4 held that there was an infringement. The case was then taken to the house of lords, and the judges of England were requested to give their opinion to the lords; and after argument, 7 judges gave their opinion that there was an infringement, and 4 judges gave theirs that there was no infringement. At length the question was finally decided by the lords, that there was no infringement; thus overruling the majorities of two assemblages of the judges of England. The principal reason for holding that there was an infringement was, that the thing patented was improving steel by mixing carburet of manganese in the crucible with it, and it was wholly immaterial whether this compound was made out of or in the crucible; while the principal reason for holding that there was no infringement was, that the thing patented was the putting a certain compound into the crucible with iron, and thereby producing the effect, whereas Unwin put wholly different materials into the crucible, and then, by means of a double electric affinity and chemical action, they produced their effect. 2. As to infringement by the sale of the thing patented, it must be a sale of the whole thing, and not of the different parts or materials out of which it may be made. Yet no evasion of a patent right would be permitted, merely by selling a part at one time, and to one person, and other parts to others, with the intent that they should be put together and so make the whole machine. 3. A curious question has arisen as to the interference of local rights under a patent. Thus, a man has a right for the county of Hamilton to make and sell certain patent bedsteads; another man has a similar right for the adjoining county of Dearborn. The first man sells a large quantity to a purchaser, who takes them into Dearborn and undersells the person having the right for that county. It seems now to be determined that this is not an infringement or unlawful interference; and the supreme court of the United States have gone even further than this, and have decided that any one who has an exclusive right to a patented machine within a certain district, cannot use that machine out of that district, but that he may sell anywhere the products made under the patent within that district. 4. Interesting questions have arisen as to the right of repair. If one buys a patented machine, and it wears out, he cannot make another under pretence of repairing that which he bought; but he may prolong its existence and utility by mere repair as long as he can. If he repairs this part to-day, and that to-morrow, and in every repair makes some renewal, until at last no part of the original machine is left, we doubt whether the law would interfere, if each repair had been made at the time in good faith, as repair and not as renewal. 5. It remains to treat only of the remedy in case of infringement. The statute of 1836 provides that damages may be recovered by "an action on the case;" which right would exist equally at common law. But this remedy would often be wholly inadequate, were it not for the further and more effectual remedy provided by the principle of equitable jurisprudence, that wherever a legal right exists, and this right is invaded or violated, and the damages recoverable are an insufficient remedy, courts of equity will grant an injunction against the offender and so prevent a repetition of the offence. But this great remedy will not be granted unless the court can see that it is necessary to prevent further violation of right, and vexatious and insufficient litigation. And if this injunction or prohibition against a repetition of the offence be disregarded, the offender will be punished by imprisonment, or such other penalty as will, in the judgment of the court, compel obedience. Generally, an injunction will not be granted until the plaintiff's rights and the defendant's wrong doing have been established in an action at law. But when the infringement is certain, a court of equity will proceed at once; and not unfrequently, on petition of the patentee, they direct a trial at law, and order the defendant to keep an exact account of all that he makes or sells in supposed infringement of the patent, to be rendered if the trial results in establishing the infringement.—The commissioner of patents makes a yearly report to the secretary of the interior, which, with its accompanying documents, is published at government expense; these constitute in some degree the records of the office. The whole number of patents granted by the U. S. government up to March 18, 1861, was 31,670. In the years from 1840 to 1849 the average of applications for patents was 1,000; the average of patents granted was 550. For the succeeding 7 years the average of applications was 3,800, and the average of patents granted was 1,750. In 1858 the number of patents granted was 3,710; in 1859, 4,538; and in 1860, 4,819. During 9 years of its administration the expenditures of the patent office have been greater than the receipts; but at all other times the receipts were considerably in excess of expenditures. There is now (March, 1861) in the treasury of the patent office $89,000.—The commissioners of patents in Great Britain have printed in several hundred 4to. volumes (1853–'8) the specifications of all the patents granted in that country up to 1852, amounting to about 13,000, with lithographed plates in separate folio volumes.

PATERCULUS, Caius Velleius, a Roman historian, born about 19 B. C. He was descended from an ancient Campanian family. His father was prefect of cavalry, and the son, early entering military life, attended C. Cæsar, the grandson of Augustus, in his eastern expedition in A. D. 2, and subsequently served under Tiberius in Germany, Pannonia, and Dalmatia. In 6 he became quæstor, had a share in the triumphal procession of the emperor in 12, and was elected prætor in 14. He had early gained the good will of Tiberius, and of his favorite Sejanus, and it has been conjectured that he was executed in 31 with the latter and his friends, although nothing certain is known of his death. His reputation rests upon his Roman history, which appears to have been written in A. D. 30, and goes under the title of *C. Velleii Paterculi Historiæ Romanæ, ad M. Vinicium Cos, Libri II.* The manuscript was discovered in the monastery of Murbach in Alsace by Beatus Rhenanus, who printed it at Basel in 1520.

PATERSON, the capital of Passaic co., N. J., on the Passaic river, near the falls, and on the Morris canal and New York and Erie railroad, 17 m. N. W. from New York; pop. in 1860, 19,618. It is a well built city with paved streets, generally wide and straight and lighted with gas, and contains a large number of handsome private residences. The falls supply power to many factories, several of which occupy extensive stone buildings. There are 8 large cotton mills, having an aggregate capital of $595,000, and producing annually to the value of $752,961, principally cotton yarn. Of these, the Paterson manufacturing company and the Phœnix manufacturing company make large quantities of cotton duck, the former to the annual value of $115,000. Paterson is specially noted for its extensive machine shops and steam-engine manufactories, and is stated to make at least half the locomotives constructed in the United States. The Rogers locomotive and machine works have a capital of $300,000; during the year 1860 they employed an average of 720 hands at an expense of $24,000 a month, and turned out, beside a large quantity of cotton and other machinery, 90 locomotives; total production, $765,000. The establishment of Danforth, Cooke, and co., capital $300,000, employed 540 hands and produced to the value of $583,000, including 36 locomotives. There are 7 other machine shops of some extent, with an aggregate capital of $190,000 and an annual production of $244,812, and a manufactory of stationary steam engines, capital $40,000, producing $95,000. The paper mill of H. V. Butler and co. occupies a fine building, and, with a capital of $200,000, manufactures to the value of $289,000. Among others are 4 silk manufactories, aggregate capital $153,000, producing $846,000; 1 flax and hemp, capital $200,000, producing $140,000; a printing, dyeing, and bleaching establishment, capital $200,000, producing $180,000; and a wick and twine factory, capital $40,000, producing $75,600. Beside the county offices, there are an academy, a bank, 2 newspaper offices, a mechanics' and a philosophical society, and 16 churches, viz.: 2 Baptist, 1 colored Congregational, 1 Episcopal, 1 Independent, 4 Methodist, 2 Presbyterian, 3 Reformed Dutch, and 2 Roman Catholic. The town was founded in 1791 by a manufacturing company with a capital of $1,000,000.

PATERSON, William, founder of the bank of England, and of the Scottish colony of Darien, born according to tradition in Skipmyre, Tinwald parish, Dumfriesshire, in the spring of 1665, died in Jan. 1719. He was originally destined for the Presbyterian ministry, and is said to have been among the Covenanters persecuted by Charles II. To escape from these persecutions he went to London in the capacity of a merchant, and also visited America, where he acquired from the buccaneers much information in regard to the Spanish main, of which he subsequently made great use in connection with the Darien expedition. It is a question whether he was criminally concerned in the violent courses of these marauders, but the probabilities are that he was not. In 1692 he was a merchant in London, as is evident from a lease authorizing him and two others to construct the Hampstead water works. About this time he made proposals in regard to founding a bank of England, and a tract entitled "A Brief Account of the intended Bank of England," is supposed to have been written by him. He was one of the first directors of the institution, but for some cause resigned. He had long before conceived the project of founding "a free commonwealth in Darien," and after several unsuccessful efforts to have his scheme adopted by England and by other states, it was finally sanctioned by a Scottish act of parliament in 1695 constituting the Darien company. (See Darien, Colony of.) After the failure of the expedition, which would probably have been successful if his advice had been followed, he returned to England and devised a new plan for the colony; but the unexpected death of King William, over whom he had great influence, destroyed all possibility of reviving the project. He was an able advocate of the union of England and Scotland, and when the treaty to that effect was passed, an indemnity was recommended to be given him on account of the losses he had suffered in the Darien expedition, and of his "carrying on other matters of a public nature, much to his country's service." But it was not till the reign of George I., and after a long struggle with the government for the settlement of his claims, that it was paid. Paterson was in 1708 a member of parliament for Dumfriesshire. The last years of his life were spent in Westminster. He was an early and zealous advocate of the principles of free trade, was a decided opponent of the schemes of John Law, and in all matters of trade and finance his ideas seem to have been far beyond the times in which he lived. (See Bannister's "William Paterson, the Merchant, Statesman, and Founder of the Bank of England, his Life and Trials," Edinburgh, 1858.) His works, which are numerous, have been lately collected under the title of "The Writings of William Paterson, with a Biographical Introduction" (2 vols. 8vo., 1858).

PATKUL, Johann Reinhold, a Livonian nobleman, born in a prison at Stockholm about 1660, executed at Kazimierz, near Posen, Oct. 10, 1707. Livonia being then a province of Sweden, he first served as a captain in the Swedish army. In 1689 he was one of a deputation of noblemen sent to Charles XI. to remonstrate against the encroachments of the royal officers upon the rights and privileges of Livonia; and although among the youngest, he was chosen spokesman, and addressed the king with particular energy. Three years later, in the capacity of a deputy from his fellow nobles, he remonstrated strongly with the Swedish governor at Riga, and addressed an eloquent letter to the king. Having participated in other patriotic manifestations, Patkul, in connection with the marshal and members of the Livonian diet, was summoned to Stockholm. Procuring a safe-conduct, he obeyed the summons, but soon judged it necessary to flee to Courland; and a few weeks after his escape he was condemned to be beheaded as a rebel, his property was confiscated, and his writings were burned by the executioner. Being no longer safe in Courland, he retired to the canton of Vaud, Switzerland, where he engaged in scientific pursuits, and afterward visited France. In 1698, after the accession of Charles XII., he sued for pardon; but his petition being rejected, he entered the service of the elector Augustus II. of Saxony, king of Poland, who appointed him one of his privy council. He participated actively in the coalition between his new master, the king of Denmark, and the czar of Russia against Charles XII., and at different times endeavored to rouse Livonia against the Swedish rule. Dissatisfied with the overbearing manners of Flemming, the principal minister of Augustus II., and having moreover, during a mission to Russia, won the favor of Peter the Great, he accepted from the czar the rank of general and the office of Russian ambassador to Dresden. This conduct roused the displeasure of Augustus II., who, notwithstanding Patkul's official character and the risk of endangering his friendly intercourse with the czar, caused him to be arrested in 1705. When afterward Augustus, defeated by Charles XII., was obliged to abdicate his Polish throne, one of the conditions of peace imposed upon him was the surrender of Patkul. Augustus gave secret orders that his prisoner should be suffered to escape, but they were not obeyed. By Charles's command, Patkul was taken to the convent of Kazimierz and condemned to death by a court martial. He was first broken on the wheel, and then, while still living, carried to the scaffold, where he was beheaded. His corpse was then quartered and put on the wheel again. When Augustus II. was replaced on the throne of Poland, he caused the remains of Patkul to be collected and buried at Warsaw.

PATMORE, Coventry, an English poet, born in Woodford, Essex, July 23, 1823. He is the son of P. G. Patmore, a man of much literary industry in the early part of the 19th century, and commenced his career by the publication of a volume of poems which attracted little notice. It was succeeded in 1853 by "Tamerton Church Tower and other Poems," and in 1856 by his most popular poem, "The Angel in the House," in two parts, the first entitled "The Betrothal" and the second "The Espousals." His last work, "Faithful for Ever" (London, 1860), a sort of pre-Raphaelite attempt to give a poetic interest to the commonplace incidents of life, has been severely criticized by the leading literary periodicals of Great Britain, but has met with a warm eulogist in Mr. Ruskin. Mr. Patmore is also a contributor to the "Edinburgh Review." Since 1846 he has been one of the assistant librarians of the British museum.

PATMOS, or as it is now called **Patmo**, an island of the group called the Sporades in the Grecian archipelago, 20 m. S. of the W. extremity of Samos, and about the same distance W. of the coast of Asia Minor. It consists of an irregular mass of barren rock 28 m. in circumference, and in the time of the Roman emperors was used as a place of banishment. It was to this island that St. John the apostle was exiled by the emperor Domitian, A. D. 95; and here, according to universal tradition, he wrote the Apocalypse, and perhaps his Gospel also. On the side of a hill a cavern is pointed out by the Greek monks, who have a monastery in the vicinity, as the exact spot where the evangelist received the revelation, and through some fissures in the roof he is said to have heard the "voice from heaven like the sound of a trumpet." The monastery, built by the Byzantine emperors in the 12th century, is under the patronage of

"St. John the Divine," and inhabited by about 50 monks, subject to the patriarch of Constantinople. On the E. side of the island there is a small village and a good port. The island is subject to the Turks, but the inhabitants, 4,000 in number, are all Greeks. They subsist chiefly by agricultural labor on the mainland or the more fertile islands, migrating for the purpose every summer.

PATNA, a district of British India, in the lieutenant-governorship of Bengal, bounded by the districts of Sarun, Tirhoot, Monghyr, Shahabad, and Bahar, extending from lat. 25° 8′ to 25° 38′ N., and long. 84° 45′ to 86° 10′ E.; area, 1,828 sq. m.; pop. 1,200,000. Beside the capital, of the same name, the chief towns are Dinapore, a large military station, and Phatuka. The Ganges flows along its N. frontier, and the river Sone forms the W. and N. W. boundary and is navigable for a considerable distance. There are many smaller streams, and during the rainy season the province is intersected by water courses in every direction. It is fertile and highly cultivated. The climate is very hot in summer. The growth of the white poppy, from which opium is made, is a monopoly rented to the Patna opium company by the government. About 6,500,000 lbs. of poppy juice are annually manufactured, yielding a revenue of £3,500,000. The East India railway passes through the province. Patna was included under the grant of Bengal, Bahar, and Orissa, made by Shah Alum to the English in 1765. It was the scene of some of the most memorable events in the great mutiny of 1857, every part of the district except the capital having been for a long time in the hands of the insurgents.—PATNA, the capital of the above described district and of the province of Bahar, is situated on the right bank of the Ganges, 300 m. N.W. from Calcutta; pop. 284,132. The city proper, or fort, is of rectangular form, surrounded by a wall which extends about 1½ m. along the bank of the river, and ¾ m. inland. The suburbs are very extensive, and stretch about 7½ m. along the Ganges. The principal thoroughfare, parallel to the river, is wide, though neither straight nor regular; and the other streets and lanes are narrow and crooked. Some of the houses are built of brick, and have flat roofs and balconies; but many of them are made of mud, and covered with tiles and thatch. There are several Mohammedan mosques, but they are regarded with little reverence, and most of them are now used as warehouses. There is a school where the English language and literature, history, and mathematics are taught. The manufactures of Patna are not very important; and the chief trade is in opium, rice, indigo, wheat, and sugar. A great deal of traffic is carried on upon the Ganges, and Patna is a station on the East India railway. Patna was taken by the British in 1764, when they defeated the troops of the nabob of Bengal under its walls. A monument is erected in the city to the memory of 200 of their countrymen who were cruelly murdered by the nabob a few months before his defeat.

PATOOK, or PATUCA, a river of Honduras, falling into the bay of Honduras, about 110 m. E. of the port of Truxillo. It rises in the heart of the department of Olancho, in the vicinity of the city of Juticalpa, and is formed by the junction of the rivers Jalan, Tinto, Guayape, and Guallambre, all celebrated for their gold washings. Through the coast alluvions, for a distance of 60 m., it is a deep and navigable stream; but above that point it is interrupted by numerous rapids, and among them what is called the Portal del Infierno, a deep and narrow chasm, through which the river rushes with irresistible force. The principal mouth of the Patook opens directly into the sea, and is obstructed by a bad and shifting bar, with only from 8 to 10 feet of water. The second mouth of the Patook opens into Brus or Brewer's lagoon, but will not admit vessels of more than 6 feet draft. The total length of the river is about 150 m., and it affords the best means of communication with the large and rich department of Olancho.

PATRAS, PATRASSO, or BALIABARDA (anc. *Patræ*), a fortified seaport town of Greece, in the N. W. part of the Morea, on the gulf of the same name, capital of the prefecture of Achaia and Elis; pop. about 8,000. It is situated partly on a spur of Mt. Voidhia, on which stood the ancient town, and principally on the level plain below it. The streets are broad and straight, intersecting one another at right angles; the houses are mostly of one story, being built low as the best security against earthquakes. The most important public building is the castle, which is situated on the site of the ancient acropolis. Patras is the principal seat of the foreign trade in the Morea. For the protection of the harbor, which is unsafe and exposed to heavy seas, a mole has been constructed.—The ancient city was founded by the Ionians, from whom it was wrested by the Achæans under Patreus; from him the city received its name of Patræ. During the Peloponnesian war it alone of the Achæan towns embraced the side of the Athenians. In 419 B. C. Alcibiades persuaded the inhabitants to join the city and port by a long wall. It was a member of the Achæan league, and during the war between the Achæans and Romans it suffered extremely, and became an insignificant town. In that condition it remained until the reign of Augustus, who selected it as one of the two Roman colonies established on the W. coast of Greece. It was destroyed by an earthquake in the 6th century; subsequently it was a dukedom of the Byzantine empire; was sold to the Venetians in 1408; was taken by the Turks in 1446, was after a vigorous defence retaken by Andrea Doria in 1532, and again recovered by the Turks, in whose hands it remained until the Greek revolution. It was the first city to raise the standard of revolt, but during the war the castle was held by a Turkish garrison, which capitulated in 1828 to a French force.—The gulf of Patras lies between Ætolia and the N. W. coast of the Morea, and between the gulf of Lepanto on the E. and the Ionian sea on the W. Its greatest length is 50 m., its greatest breadth 14 m. Its navigation is difficult, and during the winter months sometimes dangerous.

PATRIARCH (Gr. *πατριάρχης*, chief of a race), a title applied to the fathers or heads of generations mentioned by the sacred writers from Adam to Jacob. After the destruction of Jerusalem it was the title of the chief religious rulers of the Jews in Asia; and in early Christian times it became the designation of certain bishops who exercised superior jurisdiction. These were the bishops of the 5 chief dioceses of Rome, Constantinople, Alexandria, Antioch, and Jerusalem. Certain other bishops were likewise termed patriarchs in course of time, especially those of newly converted nations. In modern times patriarchs have jurisdiction over all the bishops and metropolitans or archbishops of their patriarchates, but their authority extends little beyond the right of convoking councils and exercising a general watchfulness over the conduct of their subordinate prelates. The patriarchs at present in communion with the see of Rome are those of Constantinople, Alexandria, Antioch, Jerusalem, the East Indies, Venice, and Lisbon, beside those of the Melchites, Maronites, and Syrians at Antioch, Armenians in Cilicia, and Nestorians (Chaldeans) nominally at Babylon. In the orthodox Greek church the title of patriarch is attached to the sees of Constantinople, Alexandria, Antioch, and Jerusalem, and various Christian sects of the East have patriarchs.

PATRICIANS (Lat. *patricii*, from *pater*, a father), the name given by the Romans to the members and descendants, by blood or adoption, of the original houses of which the *populus Romanus* was wholly composed until the establishment of the plebeian order. They were at first divided into the tribes of Ramnenses, Titienses, and Luceronses, each tribe consisting of 10 *curiæ*, and each curia of 10 *gentes*, or in regard to representation and war of 10 *decuriæ*. The *gens*, all the members of which bore the same gentile name, sent its leader to the senate. Originally the two tribes of Ramnenses and Titienses enjoyed exclusive political privileges, but the Etruscan tribe of Lucerenses was admitted to the same rights by Tarquinius Priscus, and the number of senators, which before had been 200, was in consequence increased to 300. To distinguish the old senators from the new, the former were called *patres majorum gentium*, and the latter *patres minorum gentium*. At this period, all the population who were not patricians were clients or slaves. After the formation of the plebeian order, the patrician became a real aristocracy of birth, which held possession of all the civil and religious offices. No matter how poor he was, a patrician could not become a plebeian unless he voluntarily left his gens and curia, and gave up its obligations and privileges; and no matter how wealthy he was, a plebeian could not become a patrician except in accordance with the *lex curiata*, and this was rarely the case. At the end of the republic the number of patrician families had diminished to about 50, and both Julius Cæsar and Augustus and the succeeding emperors found it necessary to raise plebeians to the patrician rank. The long struggle in which the plebeians were engaged for the possession of their political rights resulted in their complete victory, only a few insignificant offices being retained by the patricians. The formation of the new aristocracy, founded upon wealth and upon the holding of the offices of consul, prætor, and curule ædile, rendered the old patrician families of still less account. During the empire the Roman citizens were divided into the two classes of *populus* and *patricii*. At the accession of Constantine the patrician families had almost entirely died out, and that monarch made it a personal title instead of a hereditary distinction. It was granted to all, without regard to birth, who had made themselves eminent by their services to the empire or the emperors. With the exception of the consuls, they constituted the highest rank in the state. Those members of the patrician body who were in actual service, as usually most of them were, went under the name of *patricii præsentales*; the others were called *patricii codicillares* or *honorarii*. This distinction was conferred by most emperors with much caution, but some granted it even to eunuchs. It was also conferred at times on foreign princes; and the governor of Ravenna, who exercised the power of a supreme magistrate, was styled indifferently exarch or patrician. After the loss of Italy, the Romans conferred this title on their rulers and protectors, such as Charles Martel and his descendants; and in this capacity Henry IV. claimed the right to depose Pope Gregory VII. During the middle ages families entitled patrician sprang up in many of the cities. In Venice members of the great council and their descendants were called patricians. After 1297 no person was created patrician, but all descendants of those who had belonged to that body became members by right at the age of 25. In Rome, Genoa, and other cities of Italy, the title of patrician was and is still used to denote a member of the nobility.

PATRICK, a S. co. of Va., bordering on N. C., and drained by the Dan, Smith's, and North and South Mayo rivers, all of which have their sources in the Blue ridge, which forms its N. W. boundary; area about 500 sq. m.; pop. in 1860, 9,359, of whom 2,070 were slaves. It has a mountainous surface, and is noted for its picturesque scenery; much of the soil is fertile, and iron ore is abundant. The productions in 1850 were 248,858 bushels of Indian corn, 90,441 of oats, 12,755 of wheat, 429,699 lbs. of tobacco, 8,523 of wool, and 66,957 of butter. There were 2 grist mills, 2 tanneries, 1 furnace, 1 forge, 18 tobacco factories, 12 churches, and 836 pupils attending public schools. Value of real estate in 1856, $1,321,719, showing an increase since 1850 of 76 per cent. Capital, Taylorsville.

PATRICK (PATRICIUS), SAINT, the patron saint of Ireland, born, according to most authorities, near the site of Kilpatrick, at the mouth of the Clyde, in Scotland, in 372, died at Down, Ulster, probably in 464. At the age of 16 he was carried captive to Ireland by a band of marauders, but made his escape after 6 months and reached Scotland. Carried off a second time, and again escaping, he resolved to become a missionary to the Irish, was ordained in Scotland, and after a long preparation was consecrated bishop. Having previously, according to some accounts, visited Gaul and perhaps Italy, he passed over to his chosen field of labor about 432, and preached the gospel with such extraordinary effect that, although not absolutely the first to introduce Christianity into that country, he has always received the credit of its general conversion. He baptized the kings of Dublin and Munster, and the 7 sons of the king of Connaught, with the greater part of their subjects, and before his death had converted almost the whole island to the faith. St. Bernard testifies that he fixed his metropolitan see at Armagh, and it appears that he appointed several other bishops, with whom he held councils to settle the discipline of the church which he had planted. In his old age he wrote his "Confession," the authenticity of which, however, is doubted. It may be found in Sir James Ware's edition of the works of St. Patrick (8vo., London, 1658). The Roman Catholic church keeps his festival on March 17. A popular legend ascribes to him the banishment of all venomous creatures from the island by means of his crosier or staff, which Ralph Higden in his "Polychronicon" mentions as being kept with great veneration at Dublin in 1360.

PATRICK, SIMON, an English prelate and author, born in Gainsborough, Lincolnshire, in 1626, died May 31, 1707. He was the son of a mercer in his native town, and was educated at Queen's college, Cambridge, where he received a fellowship in 1648. In 1658 he was presented with the living of Battersea, and about this time published his "Mensa Mystica, or a Discourse concerning the Sacrament of the Lord's Supper; to which is added a Discourse concerning Baptism." The following year he produced a treatise entitled "The Heart's Ease, or a Remedy against all Troubles;" and in 1660 another under the title of "Jewish Hypocrisy, a Caveat to the Present Generation." By the earl of Bedford he was presented with the living of St. Paul's, Covent Garden, where he remained several years. In 1679 he became dean of Peterborough, in 1689 bishop of Chichester, and in 1691 bishop of Ely. He published, beside a translation of Grotius *De Veritate*, a large number of works, chiefly devotional, the most important of which was his "Commentary and Paraphrase on the Old Testament" (14 vols. 4to., London, 1695); it extends to Solomon's Song, and was completed by Lowth and Whitby for the whole Bible. Dr. Patrick's writings gave him considerable reputation in his day, and are still valued. He was selected to revise the collects of the whole year after his appointment as one of the commissioners for the review of the liturgy, but the revision never came into use. The first collected edition of his works was printed by the Oxford press in 9 vols. 8vo. (1859).

PATRIMONY OF ST. PETER, the name formerly applied to a part of the Papal States, consisting mainly of the territory given to the church by the countess Matilda in 1077. It corresponds to the modern delegation of Civita Vecchia, together with the S. part of Viterbo, and the N. W. part of the comarca di Roma.

PATROCLUS, a Greek legendary hero, the inseparable friend of Achilles, and son of Menœtius of Opus. While a boy he accidentally killed Clysonymus, and in consequence was sent to the court of his kinsman Peleus, and brought up with Achilles, whom he accompanied in the expedition against Troy. He occupied a prominent position in the siege until his friend absented himself from the conflict by reason of his quarrel with Agamemnon, when Patroclus also withdrew; but the affairs of the Greeks becoming desperate, he obtained from Achilles his armor and his troops, and with their assistance drove back the Trojans and saved the ships from burning. During the conflict he was struck senseless by Apollo, and was killed by Euphorbus and Hector, the latter taking possession of the armor. In the fight that ensued for the dead body the Greeks were successful. His ashes were buried under a mound, which not long afterward was opened to receive the dead body of Achilles, who had revenged his friend by the death of Hector.

PATRON (Lat. *patronus*, from *pater*, a father), an appellation given by the Romans to a patrician who had plebeians, called clients (see CLIENT), under his protection, or to a master who had freed his slave. When a slave was manumitted, he himself was called *libertus* or freedman, and his master *patronus*, and between them existed certain duties and privileges, which however seem to have been more fixed by custom than by law. The patron took the freedman under his protection, and the freedman owed to his former master respect and gratitude, and was bound to support both him and his children in cases of necessity. By a special agreement the *libertus* after he was freed took an oath to make an offering to the patron of gifts and services, the latter being of two kinds, services of respect and services of labor. The former ended with the death of the patron, but the latter were due also to his heirs. The patron was not entitled to any services that were either dangerous or disgraceful; and by the *lex Julia et Papia Poppæa* freedmen, with a few exceptions, were discharged from all requirements as to gifts and services, if they were the parents of two children who were in their possession, or were the parents of one child 5 years old. The most important relation existing between the patron and freedman was the right of the former in certain cases to become the heir of the whole or a portion of the property of the latter. By the laws of the 12 tables, if a freedman died intestate without heirs of his own, the patron became his heir, as he was supposed to stand in the relation of an *agnatus*. By the *lex Papia*, when a freedman left property valued as high as 100,000 sesterces, some of it went to the patron whether a will had been made or not. If there were 3 children, however, the patron had no share. These rights of a patron extended to his direct but never to his collateral heirs, and the privileges of the *liberti* in regard to the succession of property extended only to those who were Roman citizens and not to the Latin freedmen. The latter "lost their life and their liberty at the same time," and their property passed into the hands of those who had manumitted them. In many other points the succession to their property differed from the succession to that of the Roman freedmen, and on this subject laws were passed during the reigns of Claudius and Trajan. These regulations were radically changed under Justinian, who gave to the Latin freedmen the same privileges as were possessed by the Romans. If a freedman was guilty of ingratitude, his patron might punish him summarily, and in later times he had the right to relegate him some distance from Rome. In the time of Nero an effort to pass a decree enabling a patron to reduce his freedman again to slavery failed, but afterward it was successful. The patron lost his rights, however, if he neglected to support his freedman in a case of necessity. The *libertus* assumed on his manumission the gentile name of his patron.—In the canon law, a patron is a man who has the right of disposing of a benefice, from the fact that it was founded or endowed by him or by those to whose rights he has succeeded. This right is said by some to have sprung up about the close of the 4th century, and was probably intended to offer inducements to the wealthy to found churches with the privilege of naming the person who should officiate. In the Roman Catholic church, a patron is a saint under whose protection a person places himself, often from bearing the same name, or who holds that relation to a community; or a saint to whom a particular church or order is dedicated.

PATTERSON, Daniel T., an officer of the U. S. navy, born in the state of New York, died in Washington, Aug. 15, 1839. He entered the navy as a midshipman in 1800, and was attached to the frigate Philadelphia, Capt. William Bainbridge, when she ran upon a reef of rocks off Tripoli in Oct. 1803, and, being in a defenceless condition, surrendered to a flotilla of Tripolitan gun boats. (See Bainbridge, William.) He remained a prisoner in Tripoli until peace was concluded with that regency in 1805. In 1807 he was promoted to the rank of lieutenant, and in 1813 to that of master commandant. In 1814 he commanded the naval forces of the United States at New Orleans, and coöperated so ably with Gen. Jackson in the defence of that city that he received the thanks of congress. He was promoted to the rank of captain in Feb. 1815, served as navy commissioner from 1828 to 1832, and in command of a squadron in the Mediterranean from 1832 to 1835. He died while in command of the navy yard at Washington.

PATTISON, Robert Everett, D.D., an American clergyman and teacher, born in Benson, Vt., Aug. 19, 1800. He was graduated at Amherst college in 1826, was soon after appointed a tutor in Columbian college, D. C., was ordained as a Baptist minister in Sept. 1829, at Salem, Mass., and in March, 1830, settled as pastor of the first Baptist church in Providence, R. I. From this post he was called to a professorship in Waterville college, Me., and in 1836 to the presidency of that college, which he resigned in 1840. He then returned to his pastoral charge at Providence. In 1843 he was elected one of the corresponding secretaries of the Baptist board of foreign missions. In 1846 the trustees of the western Baptist theological institute, at Covington, Ky., elected him president and professor of Christian theology. In this position he continued till 1848, when by an act of the Kentucky legislature, subsequently decided by the supreme court of the state to be unconstitutional, the control of the seminary was wrested from the trustees and placed in other hands, and the professors were dismissed. Dr. Pattison was immediately appointed to a similar professorship in the Newton theological seminary, Mass., from which, after 5 years' service, he was again called to the presidency of Waterville college in 1853. After some years he resigned on account of his health, and he is now at the head of the Oread female institute at Worcester, Mass. He received the degree of D.D. from Brown university in 1838. Beside contributions to periodicals and one or two addresses, he has written a "Commentary, Explanatory, Doctrinal, and Practical, on the Epistle to the Ephesians" (Boston, 1859).

PATUXENT, a river of Md., rising about 20 m. from Frederic City, and after a S. E. course of about 40 m. and a nearly S. course of 50 m., discharging itself through an estuary 2 or 3 m. wide into Chesapeake bay. It forms the dividing line between Montgomery, Prince George, Charles, and St. Mary counties on the S. and W., and Howard, Anne Arundel, and Calvert counties on the N. and E. Small vessels can ascend it 50 m. to Nottingham.

PAU, a town of France, capital of the department of Basses-Pyrénées, on the right bank of the Gave de Pau, 470 m. S. by W. from Paris; pop. in 1856, 17,238. It is regularly laid out and well built, having a broad main street, several squares, and fine public walks on its outskirts. Its situation on a precipitous height is delightful; in the vicinity are picturesque valleys, and on the S. the eye rests in the distance upon the snowy peaks of the Pyrénées. The charm of the scenery and the mild and healthful climate attract to Pau a considerable number of foreign visitors and permanent residents. Linen cloths, renowned as *toiles de Béarn*, and fine table cloths, tapestry carpets, and cutlery are manufactured.—Pau was founded in the 10th century; a viscount of Béarn built a strong castle on the top of a hill, and having marked the limits of the ground with stakes or *paus*, the town which formed itself around retained the appellation. In the 14th century the castle was rebuilt by Gaston Phébus, count of Foix, and the city became the chief town of Béarn. The castle was enlarged and embellished during the 16th century. Henry IV. was born there; and the room where this event took place has still its ancient portraits and furniture, as well as the tortoise shell that was used as a cradle for the infant prince. The castle itself was repaired and renovated in the time of Louis Philippe; it is one of the summer resorts of Napoleon III. and his court. A marble statue of Henry IV. stands in the vestibule of the castle; and two others, one of white marble erected in 1843, and one in bronze, adorn the principal squares.

PAUL, the name of several popes, of whom the most distinguished are the following. I. Paul III. (Alessandro Farnese), born in Rome in 1465, died in Nov. 1549. He succeeded Clement VII. in 1534, and summoned a general council to meet at Mantua, but afterward transferred it to Trent, where the first session was held in Dec. 1545. He made an abortive league with the emperor and the republic of Venice against the Turks, and induced Francis I. and Charles V. to conclude a truce for 10 years at Nice (1538), which was not however observed. He excommunicated Henry VIII. of England, established the inquisition at Naples, approved the society of Jesus, sent a contingent of 12,000 foot and 1,000 horse to join the emperor's forces in Germany against the Protestants, and opposed the religious pacification called the *interim* granted by Charles V. in 1547. He exerted himself zealously to subdue the turbulent feudatories of the Papal States, and expelled the powerful Colonna family from Rome. Before becoming a priest he had a son and daughter, the former of whom was created duke of Parma and Piacenza. II. Paul IV. (Giovanni Pietro Caraffa), born in 1476, died Aug. 18, 1559. He succeeded Marcellus II. in 1555, and displayed an energy in his administration which had not been expected from his advanced age and previous studious habits. He concluded an alliance with Henry II. of France against the emperor Charles V. (Dec. 1555), and afterward against Philip II., in consequence of which his dominions were invaded by the duke of Alva, and the Spanish troops advanced almost to the gates of Rome. A peace however was concluded in 1557. The emperor Ferdinand I. having accepted the throne without consulting the holy see, the pope dismissed the imperial ambassador, and Ferdinand accordingly did not come to Rome to be crowned, an omission which was imitated by all the succeeding emperors. Paul IV. was a zealous opponent of the Protestants, against whom he issued a bull in 1559, and coöperated earnestly with Queen Mary in her attempts to restore Catholicity in England. He introduced the inquisition into his states, labored assiduously for the reformation of the clergy, and founded the order of Theatines, who took their name from the archbishopric of Theate or Chieti, which he had held before he became pope. He raised his nephews to the highest honors in the state, and made one of them a cardinal, though his past life had been that of a soldier and a libertine; but hearing that they abused their power, he banished them from Rome in 1559. He was hated by his subjects, who rose in tumult on the news of his death, and threw down his statue, crying: "Death to the Caraffas." III. Paul V. (Camillo Borghese), born in Rome in 1552, died Jan. 16, 1621. He succeeded Leo XI. in 1605, and soon after his accession was involved in a dispute with the republic of Venice respecting the foundation of religious houses, the alienation of charitable bequests, and the trial of ecclesiastics by lay tribunals. He excommunicated the doge and the senate, and laid the republic under an interdict which the senate forbade to be published, and which only the Jesuits, Theatines, and Capuchins observed. These three orders were consequently banished. The pope on his side prepared to take up arms; but fearing, from an intercepted letter of Father Paul Sarpi, that advantage would be taken of such an event to introduce Calvinism into Venice, he invited the mediation of Henry IV. of France, and the dispute was settled by a compromise in 1607. The condemnation by the parliament of Paris of the *Defensio Fidei* of Suarez was the cause of angry relations with France in 1614. In the mean time Paul had devoted himself with great zeal to reforming the administration of his temporal government, embellishing Rome, and restoring ancient monuments. He exerted himself to send missionaries to the East, and received embassies from Japan, from several princes of India, and from Congo.

PAUL, Father. See Sarpi, Pietro.

PAUL I., Petrovitch, emperor of Russia, born Oct. 12, 1754, assassinated March 23, 1801. A son of Peter III. and Catharine II., Paul inherited the weakness and pusillanimity of his father, with few of the intellectual qualities of his mother. The hatred which his parents bore to each other, and which resulted in the assassination of Peter at the instigation of his wife, exerted a baneful influence upon the earliest development of Paul's mind and character. His father hated him as the offspring of a hated wife, and intended to disinherit him. Catharine, having assumed the reins of government (1762), pretended to give him an education worthy of the heir of a great empire; but even before he grew up to manhood her dislike of him had become so violent that she compelled him to live at a distance from the capital, persecuted him in every conceivable manner, surrounded him with spies, left him in absolute want of the necessaries of life, and took not the slightest pains to conceal her contempt of him. Such influences necessarily left their mark upon his temper. He became morose, revengeful, craven toward his mother, yet wilful and tyrannical toward inferiors, dead to ambition, and indifferent to the requirements of his station. At the age of 19 he was married by order of his mother to a princess of Hesse-Darmstadt, and after her death in 1776 to a princess of Würtemberg. His domestic felicity recompensed him in some degree for the contemptuous manner in which he was excluded from all participation in government affairs. His second wife bore him 4 sons (Alexander, Constantine, Nicholas, and Michael) and 5 daughters. The former were taken from their parents by order of Catharine, and brought up under her direction. In 1780 Paul travelled through Poland, Germany, Italy, France, and Holland. Afterward he took part in the war against Sweden, but even then his mother purposely deprived him of every opportunity of becoming familiar with the duties of his position. He bore this treatment in a dull, patient manner, hoarding up revenge for a future day. At last his deliverance came. Catharine died Nov. 17, 1796, and Paul ascended the throne. One of his first acts was to cause funeral honors to be paid to his murdered father, and he ordered the remains of his mother's former favorite, Prince Potemkin, to be disinterred and thrown into a ditch on the wayside. To undo whatever Catharine had done seemed to be his only guiding principle. He disbanded her armies, declared peace with Persia, disapproved of her policy toward Poland, liberated Kosciuszko and the other Polish prisoners, decreed that the female line should henceforth be excluded from succession, and invited his eldest son to an active participation in the administration of the country. But the rejoicings of the people over these happy beginnings were premature. The defects of his education soon became apparent. His narrow-minded egotism, fostered by the seclusion of his youth, combined with his nervous and fitful temper to render him an execrable tyrant. His most puerile whims and caprices were raised to the dignity of laws, and a well organized secret police was constantly active in discovering victims of his wrath. He required those who were admitted to his presence to kneel before him. When he drove out, he would punish with the utmost cruelty whoever did not alight from their carriages and prostrate themselves as he passed. He disliked round hats, and authorized any one to tear them from the heads of their wearers. He would allow no one to keep a dog near his residence. These and a thousand other petty oppressions exasperated the people even more than his hatred of liberal ideas, his decrees forbidding the importation of all books or newspapers printed in French, and similar measures. His policy in regard to the great events in western Europe was as inconsistent and capricious as his administration of the internal affairs of his empire. At first he became a party to the coalition against revolutionary France, and his army of over 100,000 men obtained some successes in Italy, Switzerland, and Holland; but having afterward suffered severe reverses, Paul became disgusted with his allies, expelled the French refugees from Russia, and endeavored to get up a coalition against Great Britain. In this he succeeded so far that Denmark, Sweden, and Prussia joined him in a treaty of armed neutrality. But his hatred against Great Britain had become so violent that he was far from being satisfied with this success. Through the columns of the "St. Petersburg Journal" he challenged to personal combat all those kings who were unwilling to take sides with him against England. At last his capriciousness and despotism reached a pitch which verged on downright madness. A conspiracy was formed against his life by a number of noblemen, among whom Counts Pahlen and Zuboff, Generals Benningsen and Uwaroff, and Lieut. Col. Tatisheff were the most conspicuous. To his son Alexander it was represented by them that they had no other object than to compel the emperor to abdicate the throne. They forced their way into Paul's chamber late at night, and presented for his signature a letter of abdication. He refused to sign, whereupon Zuboff knocked him down and kneeled upon him, and, the other conspirators joining in the deed, the emperor was murdered in the most horrible manner within hearing of his eldest son and successor, and it has even been said that his second son Constantine actually assisted in the butchery.

PAUL, Regular Clerks of St. See Barnabites.

PAUL, Saint, in sacred biography, the first Christian missionary who extended his labors beyond the limits of the Jewish people, the first Christian teacher who maintained the equality of Jews and gentiles under the new dispensation, and admitted the latter to the full participation of Christian privileges without the execution of the ceremonial law. Paul is ranked by the Christian church with the 12 apostles, and claims that rank for himself in his epistles. Our knowledge of his history is derived from the Acts of the Apostles and incidental notices in his letters to the churches. Many attempts have been made to arrange these materials in a systematic biography, of which the most comprehensive and popular is the "Life and Epistles of St. Paul," by Conybeare and Howson (London, 1854). For the critical student the works of Wieseler and Baur are the most important. Paul was a Grecian or Hellenistic Jew, by birth and country—that is, a Jew born without the limits of Palestine—but, until his conversion, a rigid Hebrew of the sect of the Pharisees, by parentage and training as well as by personal conviction. His original and Jewish name Saul appears to have been dropped and that of Paul adopted soon after his accession to the Christian ministry; for what cause it is impossible to say, nor whether the name Paul had ever been used as one of his appellations before his conversion. He was born in Tarsus, the metropolis of Cilicia. The precise date of his birth is unknown, but is proximately determined by the circumstance that Paul is spoken of as a young man at the time of the martyrdom of Stephen. The best chronologers place that event as late at least as A. D. 38. Accordingly, Paul can hardly have been born earlier than A. D. 8, or later than 12. His family enjoyed the right of Roman citizenship, either as *libertini* (slaves honorably manumitted), or in consequence of important services rendered to the state. There is reason to believe that the youth of Paul partook of the literary advantages which distinguished his native city. The traces of philosophic thought which pervade his epistles, and his evident familiarity with the Greek poets, discover a mind imbued with gentile as well as with Jewish lore. According to rabbinical law and custom, which required every male Jew to be taught some manual art, he learned the trade of a tent maker, to the practice of which he was afterward indebted in part for his support. (Acts xviii. 3, xx. 34; 1 Cor. iv. 12.) His knowledge of the law and the prophets and other essentials of a Jewish education was obtained at Jerusalem under the tuition of Gamaliel, the most learned rabbi of his time. Paul's first appearance on the stage of history connects itself with the martyrdom of Stephen, to which he was a party, being at that time a student at Jerusalem, devoted to the Pharisaic interest in that city, and probably attached to the congregation of the "libertines." From this time forth he became a zealous persecutor of the Christian church, volunteering his services to the sanhedrim for that purpose, and holding a commission from that body to ferret out, both at Jerusalem and in "strange cities," and bring to trial the confessors of the new faith. It was in the discharge of this commission, and while bound to Damascus on one of these errands, that he experienced a sudden and miraculous conversion, which changed the whole course of his life, not only arresting his work of persecution, but impelling him to become the indefatigable advocate and apostle of the faith he had persecuted. The three accounts of the matter in the Acts (ix. 7, xxii. 9, and xxvi. 14) differ in regard to the participation of Paul's companions in this remarkable experience, but all agree in their representation of the impression made on Paul himself of a voice addressing him in the name of Christ and bidding him forbear the persecution of his church. Struck with temporary blindness by this vision, he was brought to Damascus, where, after 3 days' sojourn, he recovered his sight at the hands of a disciple named Ananias and received Christian baptism. The next 3 years were spent in Arabia and Damascus, after which the apostle made a brief visit to Peter at Jerusalem, and then returned to his native city. Meanwhile a new centre of Christian influence had established itself at Antioch, the capital of Syria, and thither Paul now went at the solicitation of Barnabas, one of the leaders of that movement, who had come to Tarsus to secure his coöperation. Here he remained for a year or more, engaged in expounding and propagating the new faith. A famine which visited Judæa in the reign of the emperor Claudius (A. D. 45), induced the church at Antioch to send pecuniary aid to the Christians at Jerusalem, and Paul and Barnabas were deputed to convey the money collected for that purpose. (Acts xi. 29, 30.)[*] Having accomplished this eleemosynary mission, he returned to Antioch and made that city his head-quarters and the starting point of the missionary tours in Asia Minor and Europe which he now undertook in behalf of the faith. Three distinct journeys from this point of departure are recorded. The first, in which Paul was accompanied by Barnabas, and for a portion of the way by John Mark, who left them on the coast of Asia Minor, embraced the island of Cyprus from east to west and three of the southerly provinces of Asia Minor, viz., Pamphylia, Pisidia, and Lycaonia. In the principal cities of these countries the missionaries established Christian churches after the model of that at Jerusalem. Some time after his return to Antioch, where Paul now resumed his home ministry, the attempt was made by Judaizing Christians sent from Jerusalem for that purpose to impose the Mosaic ritual on the gentile converts. The movement was strenuously resisted by the leaders of the Antioch church, and Paul and Barnabas were sent to Jerusalem to debate and arrange this difficulty with the apostles and elders in that city. This first Christian council is assigned by different authorities to dates ranging from the year 47 to the year 53. We incline with Wieseler to place it at 50. The two delegates, after a satisfactory adjustment of this question, returned to Antioch, and with them two emissaries from Jerusalem. With one of the latter, Silvanus or Silas, Paul soon after undertook his second missionary tour, having previously separated from Barnabas in consequence of a dispute which arose between them relative to John Mark, whom Barnabas would have to go with them, but whom Paul rejected on account of his desertion of them at Perga in their first expedition. The missionaries visited Cilicia and the regions already traversed by Paul, and the churches founded by him in Pamphylia and Lycaonia. At Lystra they were joined at Paul's solicitation by Timothy, a young Greek who had embraced the Christian faith. They extended their travels through the central provinces of Asia Minor, Phrygia and Galatia, then to Mysia, and so to the western coast, where, at Troas, Paul resolved, in consequence of a dream which he interpreted as a call from God, to cross over to Europe. Accordingly the company, of which Luke, it is supposed (from the use of the first person plural which occurs here for the first time in the narrative), was one, took ship at Troas, and after a short run landed at Neapolis on the Macedonian coast. They thence proceeded to Philippi, where the Christians came into collision with a gentile party who trafficked in divination, and who inflamed the minds of the people against Paul and Silas. The apostle and his friend were publicly scourged and thrust into prison, but honorably released the next day, when the gaoler, whom Paul had baptized, represented to the magistrates that they were Roman citizens. In Thessalonica, where they made many converts among the Hellenists, they met with a strong opposition on the part of the stricter Jews, who followed them to Berea, where also success had attended their efforts. The "brethren," thinking that Paul's life was endangered, sent him away in the charge of friends who brought him to Athens. Here he held public disputations with philosophers of the leading schools, and at their invitation gave a public exposition of his doctrine in the areopagus, pronouncing on this occasion the remarkable speech on the nature of Deity—the most striking and important of all the speeches recorded of him. From Athens he went to Corinth, then capital of the Roman province of Achaia, where he enjoyed the hospitality of a Jewish family recently banished from Rome under the edict of the emperor Claudius forbidding the residence of Jews in that city. He practised here his craft of tent maker, which was also that of his host (Aquila), and so relieved him of the burden of his support. He was soon joined by Silas and Timothy, and with their assistance, urged by a vision foretelling success, he ministered for a space of nearly two years to the people of Corinth; and having established a promising church, to which two of the epistles in our collection are addressed, he returned to Antioch, touching at Ephesus and visiting Jerusalem by the way. After an interval of rest at Antioch, in the autumn, it is supposed, of the year 54, Paul entered on the third and last of his missionary journeys. Passing through various provinces of Asia Minor, he arrived at Ephesus, where the ground had been prepared for him by Aquila and Priscilla, with Apollos their convert. Here he remained during a period of 3 years, laboring with marked success, inducing, among other fruits of his ministry, the *goetæ*, or magicians, to abandon their practice and to burn their amulets—a pecuniary sacrifice of 50,000 drachmas, equivalent to $8,000 or $9,000. A hostile encounter with the silversmiths of that city, who traded in models of the temple of Diana, and who conceived their business to be endangered by Paul's preaching, hastened his departure from Ephesus. He proceeded to Macedonia, and thence to Greece; then returning to Macedonia, he crossed over to Troas, and from there, by way of Assos and the islands of Chios and Samos, he went to Miletus, accompanied by Timothy, Luke, and other disciples. At Miletus he tarried long enough to receive a deputation of the elders of the church at Ephesus, whom he had invited to meet him, and to whom he communicated his parting instructions, bidding them a final and affectionate farewell. He then embarked with his company for Rhodes and Tyre on his way to Palestine, whither he went, as he says, "bound in the spirit;" his friends in every city where he stopped on the route endeavoring to dissuade him, "the Holy Spirit," in every city, "witnessing that bonds and afflictions" awaited him; his own instinct in spite of prophecies and entreaties urging him on. The party arrived at Jerusalem at the feast of Pentecost in the year 58; they presented themselves before James and the other elders of the church, and Paul reported the many-sided success of a mission embracing a considerable portion of the Roman empire in its wide endeavor. The Christian party at Jerusalem, under the influence of the Jewish capital, and anxious to conciliate their countrymen, so far from renouncing the law of Moses, were especially scrupulous in their observance of its rites and requirements. Aware that Paul had rendered himself obnoxious to Judaizing Christians by his liberal views in relation to this matter, the elders persuaded him by an act of public conformity to humor their prejudices and disarm their hostility. At their suggestion he united with a party of four who were then discharging a Nazaritic vow, and was seen with them in the temple fulfilling the ritual purification prescribed by Levitical law. This concession was not attended with the expected result. The measure which was to have secured him against the hostile zeal of his opponents only served to betray him into their hands. Seen in the temple, he was seized on a charge of plotting against the Mosaic religion, and accused of bringing gentiles into the sacred courts. The Roman guard rescued him from the hands of the mob, and, on the discovery of a conspiracy against his life, disclosed by a nephew of Paul then residing at Jerusalem, he was sent to Cæsarea to Felix, proconsul of the province of Judæa. Felix, though seemingly satisfied of his innocence, for the sake of conciliating the Jews detained him a prisoner at Cæsarea. After the expiration of two years Felix was succeeded by Festus, and Paul was then offered the opportunity of a trial before the national council at Jerusalem, which he declined, aware of the impossibility of obtaining a fair hearing from that tribunal. Despairing of justice at the hands of his countrymen, he appealed by right of his Roman citizenship to the government at Rome, and to Rome accordingly he was sent. He reached that destination in the spring of the year 61, after the long and perilous voyage and shipwreck described in the Acts (xxvii.). While there he was permitted as a special favor to reside in a hired lodging instead of being thrust into a dungeon or confined in the barracks. Here he remained two years, and, though under constant military guard, was allowed free intercourse with his countrymen and others who chose to visit him. He was thus enabled to prosecute his missionary labors, which he appears to have done with success. Members of the imperial household were among his converts. (Philipp. iv. 22.) Here the history leaves him, and leaves us to conjecture his subsequent fortunes. The supposition of Baur, Wieseler, and many others is that he never recovered his liberty, but remained prisoner at Rome until he perished at the hands of the executioner, a martyr to his faith; but there is a widely accepted tradition that he was tried and acquitted, that he left Rome, made other missionary tours, was once more arrested, again brought to Rome, tried, condemned, and executed. It is even asserted that he passed two years in Spain, returning to Rome about 64, and suffering death by decapitation in 65, or according to some authorities Feb. 22, 68. The attentive reader of the New Testament will notice indications of the opposition, jealousy, and even persecution which Paul encountered at the hands of his fellow Christians of the Judaistic type. Other martyrs have suffered from the enemies of their faith. Paul suffered far greater trials from its professors; and when enumerating his hardships and his sorrows, he tops the climax with "perils by false brethren." (2 Cor. xi. 26.) This circumstance should be taken into the account in estimating the worth and force of a character which in moral heroism has no superior, perhaps no equal, in the world's annals.—Of the 21 epistles embraced in the canon of the New Testament, 14 are popularly ascribed to Paul and assigned to him in the current versions. Of these, the Epistle to the Hebrews is pronounced by many critics at the present day to be the work of some other hand. The genuineness of the pastoral epistles (the two to Timothy and the one to Titus), of Colossians and Ephesians, has also been called in question; and Baur even doubts the authorship of Philippians, Philemon, and the two Thessalonians, allowing as indisputably genuine only Galatians, Romans, and the two Corinthians. In this extravagant judgment few critics will agree with him. It is impossible to determine with precision the chronological order of the epistles. The two to the Thessalonians are placed first by most of the critics who admit their genuineness, and after them the Epistle to the Galatians. Then follow, in Wieseler's arrangement, 1 Timothy, 1 Corinthians, Titus, 2 Corinthians, Romans, Philemon, Colossians, Ephesians, Philippians, and 2 Timothy.

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[*] It is a disputed question whether the visit to Jerusalem recorded in this passage, or the one recorded in ch. xv., or in ch. xviii., or neither of them, is identical with the one referred to in Gal. ii. 1. In regard to these visits of Paul to Jerusalem after his conversion, his own statement in the Epistle to the Galatians conflicts with the narrative in the Acts, and no criticism has yet succeeded in reconciling the two accounts. The apostle's own testimony would seem to be the highest authority; accordingly we have followed it in speaking of the first visit. But without rejecting the testimony of the Acts altogether—*i. e.*, without abandoning our only source of information in regard to the greater part of Paul's history—we cannot ignore the visits to Jerusalem mentioned in that document, and inextricably interwoven with the whole thread of the story, however impossible it may be to match them with the declarations in the Epistle to the Galatians.

PAUL, VINCENT DE, a saint of the Roman Catholic church and founder of the congregation of sisters of charity, born at Pouy, Gascony, in 1576, died Sept. 27, 1660. He was the 4th child of a pious peasant named Jean de Paul, who, having determined to educate him for the church, put him when 12 years old to learn Latin of the Franciscan friars at the neighboring town of Acqs (now Dax). He afterward became tutor in the family of a lawyer of the place, who sent him in 1596 to the university of Toulouse, where he passed 7 years, was ordained priest in 1600, and received in 1604 the degree of bachelor of divinity. In 1605, while on a voyage from Marseilles to Narbonne, he was captured by Turkish pirates, carried prisoner to Tunis, and after being several times sold became at last the slave of a renegade from Nice. Through the influence of one of his wives, who had heard Vincent singing sacred songs at his labor, this man resolved to return to Christianity, and in June, 1607, fled from the country with his slave and reached France in a little skiff. Vincent spent the next year in Rome, where he secured the friendship of Cardinal d'Ossat, who sent him to Paris on a secret errand to King Henry IV. in 1608, and afterward procured his nomination to the abbey of St. Leonard de Chaume in the diocese of Rochelle. About the same time he was appointed almoner to Queen Margaret of Valois. In 1613 he entered the family of Emmanuel de Gondi, count de Joigny, as tutor to his 3 sons, one of whom was afterward Cardinal de Retz. To his duties as preceptor he added the task of preaching to the peasantry of his patron's estates, particularly upon the necessity of confession; and so struck was the countess with the extraordinary results of his labors that she offered 16,000 livres to any religious community which should undertake the same work among her tenantry every 5 years. The offer however was not accepted, and it was reserved for Vincent himself to found a few years later a new congregation for such missions. Having obtained in 1622 the appointment of chaplain to the galleys at Marseilles, he devoted himself to the welfare of the wretched convicts with the intensest ardor, and, after sensibly ameliorating their mental and bodily condition, went to Paris to extend his reforms to the prisons in which they were confined while waiting to be sent to the seaports. He fitted up a separate building for them, and when absent himself caused two priests who had joined in his charitable enterprise to live in the prison. He next appears at Mâcon, as the apostle of the vast multitudes of thieves and beggars for whom that city was then notorious. In 1622 he was appointed director of the nuns of the order of the Visitation in Paris, and this position he retained until his death. In 1624 the countess de Joigny revived the project of establishing stated missions among the poor, and with the coöperation of her husband and the archbishop of Paris proposed to Vincent to undertake the establishment of a new order, which she promised to endow with 40,000 livres. Accordingly in 1625 Vincent, accompanied by two other priests, took up his residence in the college of the *bons enfants*, which had been given for the purpose by the archbishop, and laid the foundation of the congregation of priests of the mission, sometimes called Lazarists from the priory of St. Lazarus which they acquired soon afterward. The associates received royal letters patent in May, 1627, at which time they had increased to 5, and were erected into a congregation by Pope Urban VIII. in 1632. (See PRIESTS OF THE MISSION.) Beside the primary object of missions among the peasantry, Vincent now devoted himself to the spiritual improvement of the clergy. He established religious exercises for candidates for orders, to which the archbishop of Paris afterward obliged all his ecclesiastics to apply themselves for 10 days before ordination; he threw open his house to all who wished to spend a few days in prayer and meditation; and every week he held what he called spiritual conferences, to which the clergy resorted in great numbers. With the assistance of Cardinal Richelieu, who admitted him to his confidence and used to consult him in making ecclesiastical appointments, he opened in 1642 an institution in which young priests or candidates for the priesthood might fit themselves for the labors of the ministry by 2 or 3 years spent in prayer and pious exercises. The result of these efforts for the purification of the church answered his greatest expectations. In the mean time he had not been idle in providing for the sufferings of the poor. Wherever he preached it had been his custom to establish "confraternities of charity," composed of women who took upon themselves to search out and relieve the distressed, without however forming themselves into a regular order. In 1633 he determined to enlarge his plan by creating a sisterhood which should pursue the same objects under a sufficiently conventual organization to insure the permanence and most beneficial working of the enterprise; and accordingly he placed 4 young women who had volunteered their services under the charge of Mme. Le Gras, a noble lady who had been several years employed under his direction in visiting the confraternities and in other labors for the poor. Such was the origin of the sisters of charity. Their rule was drawn up by degrees in the course of some years, and Vincent lived to see 28 houses of the order established in Paris, beside others in various parts of Europe. The reformation of the hospitals, the establishment of an asylum for foundlings (see FOUNDLING HOSPITAL), the instruction of idiots at his priory of St. Lazarus, and continual labors among the convicts, are the next events which we have to record in his history. It is related (though the story has been questioned) that he once offered himself in the place of a convict more unfortunate than guilty, and wore the fetters of a galley slave for several weeks before he was recognized. During the famine which depopulated Lorraine in 1638–'9 he collected and distributed upward of 2,000,000 livres among the sufferers. He attended Louis XIII. in his last illness, and was appointed by Anne of Austria one of the 4 members of the "council of conscience" to whom was committed the distribution of ecclesiastical preferments. In the wars of the Fronde he incurred the groundless suspicion of being a favorer of Mazarin, and his convent of St. Lazarus was accordingly sacked by a mob. The last labors of his life were the foundation of an asylum for aged artisans of both sexes, and a hospital for all the poor of Paris, which was opened in 1657, a royal edict obliging every beggar in the metropolis to either enter this institution or work for his living. Between 4,000 and 5,000 chose the former alternative. Vincent was beatified by Benedict XIII. in 1729, and canonized by Clement XII. in 1737.

PAUL OF SAMOSATA, a heresiarch of the 3d century. He became patriarch of Antioch in 260, and by extortion and bribery acquired great wealth. He affected extraordinary pomp, caused the hymns of the church to be abolished and others sung in praise of himself, and surrounded himself with a number of young and beautiful women who attended him wherever he went. In defiance of the ecclesiastical canons he held the office of *ducenarius*, a sort of procuratorship under the emperor. He was an especial friend of Zenobia, the queen of Palmyra, who called him to her court, admired his eloquence, and disputed with him on religion. He taught that there was only one God, who is denominated the Father; that the Word or Wisdom of God was not a substance or person, but was in the divine mind as reason in men; that Christ was a mere man who acquired this Word or Wisdom of God, becoming by it both God and the Son of God, though both in an improper sense, and gradually acquiring his knowledge and virtues; and that the divine Word withdrew from him when he suffered. His opinions were condemned in a council held about 264, but he was allowed to retain his see on promise of retracting them. Failing however to keep his word, he was again condemned and deposed at the council of Antioch in 269. The favor of Zenobia enabled him to set this sentence at defiance until 272, when Zenobia was conquered by the emperor Aurelian. The whole matter was now referred to the see of Rome, and Paul, expelled from his church, passed the rest of his life in obscurity. He had a few followers, who called themselves Paulianists. They disappear from history about the 5th century.

PAUL (Friedrich Paul Wilhelm), duke of Würtemberg, a German traveller and naturalist, born in Carlsruhe, June 25, 1797, died at Mergentheim, Nov. 25, 1860. He was educated at the court of his uncle, King Frederic I., and from love for natural sciences and travel in May, 1817, he left the army of Würtemberg to devote himself to his favorite pursuits. After having travelled extensively through Europe, he crossed the ocean, and from 1822 to 1824 journeyed in North America, making rich collections in natural history, and especially in zoology, and subsequently published an account of his expedition in a work entitled "First Journey to North America" (Stuttgart, 1835). In a second journey to America, he paid special attention to the remains of the old Aztec civilization. He subsequently made several journeys to Algeria, England, France, and Austria, and in the spring of 1849 he visited America again, travelling over Texas, the entire west of the United States on both sides of the Rocky mountains, and South America, and in 1856 sailed for Europe. From his 4th voyage to the United States, and thence to Australia, he returned home in 1859 by way of Ceylon, Egypt, Trieste, and Vienna.

PAUL VERONESE. See Cagliari.

PAULA, St. Francis of. See Francis of Paula.

PAULCON. See Constantine Faulcon.

PAULDING. I. A N. W. co. of Ga., drained by branches of the Chattahoochee and Tallapoosa rivers; area, about 400 sq. m.; white pop. in 1860, 6,667; slaves in 1859, 478. Its surface is uneven and traversed by elevated ridges; the soil in the valleys is fertile. The productions in 1850, since which time its limits have been reduced by the formation of new counties, were 256,019 bushels of Indian corn, 24,062 of oats, 44,378 of sweet potatoes, and 1,489 bales of cotton. There were 12 grist mills, 8 saw mills, 4 tanneries, 15 churches, and 324 pupils attending public schools. Capital, Van Wert. II. A N. W. co. of Ohio, bordering on Indiana, drained by the Maumee and Anglaise rivers; area, 432 sq. m.; pop. in 1860, 4,945. Its surface is level, covered with forests, and the soil, a rich vegetable mould, is very fertile. The productions in 1850 were 41,699 bushels of Indian corn, 10,704 of wheat, 4,509 of oats, and 4,214 of potatoes. It is intersected by the Wabash and Erie and the Miami extension canals. Capital, Charloe.

PAULDING, Hiram, an American naval officer, born in New York about 1800. He is a son of John Paulding, distinguished in the revolutionary war as one of the captors of Major André. He entered the navy as a midshipman in 1811, and was in the squadron of Com. McDonough in the battle of Lake Champlain, for which service he received a sword from congress. In 1844 he attained the rank of captain, and in 1857, while in command of the home squadron, broke up an expedition against Nicaragua headed by Gen. William Walker. The main body of this expedition, commanded by Walker in person, landed in Punta Arenas in the harbor of Greytown, Nov. 25. Commodore Paulding arrived on Dec. 6 in his flag ship the Wabash, and on the 8th landed a strong force under the immediate command of Capt. Engle of the Wabash, when Walker surrendered with his followers, 132 in number, who were immediately disarmed and sent to the United States. Commodore Paulding acted on this occasion without specific instructions, and his arrest of Walker upon foreign soil was not fully approved by the executive. In Dec. 1860, Nicaragua presented him with a sword and also offered a tract of land (which latter, however, the U. S. senate did not allow him to receive), in testimony of her sense of the highly important service which he had rendered the republic. Commodore Paulding, while a lieutenant, published a volume entitled "Journal of a Cruise among the Islands of the Pacific" (New York, 1831).

PAULDING, James Kirke, an American author, born in Pleasant Valley, Dutchess co., N. Y., Aug. 22, 1779, died in Hyde Park, in the same county, April 6, 1860. His father, a descendant of a Dutch family originally established in Ulster co., cultivated a farm at the commencement of the revolution on the celebrated "neutral ground" of Westchester co. The depredations of tories and "cow boys" having compelled him to remove his family to a place of safety, he resided for several years in Pleasant Valley, but after the peace returned to Westchester co., where young Paulding passed his youth. His education was acquired partly at a neighboring village school and partly by a course of self-instruction, and about the commencement of the 19th century he removed to New York, where a great portion of his subsequent life was passed. Becoming intimate with Washington Irving, whose elder brother, William Irving, had married Paulding's sister, he published in connection with him a series of periodical essays of a humorous and satirical character, entitled "Salmagundi, or the Whim-Whams and Opinions of Lancelot Langstaff and others," with which the career of each author commenced. This literary partnership terminated with the appearance of the 20th number on Jan. 25, 1808; but neither Paulding nor Irving ever attempted to make a division of their contributions, and the whole is included in the stereotype editions of the works of the former. The success of "Salmagundi" encouraged Paulding to devote himself to literature, and about the commencement of the war between the United States and Great Britain he published successfully an allegorical satire entitled "The Diverting History of John Bull and Brother Jonathan." In 1813 appeared his "Lay of the Scottish Fiddle," a parody of Scott's "Lay of the Last Minstrel," which was reprinted in London. It was followed by the "United States and England" (1814), a pamphlet defending American institutions from the attacks of the London "Quarterly Review," which brought the author under the notice of President Madison, who appointed him secretary to the board of navy commissioners. A visit to Virginia in 1816 furnished the materials for his next work, "Letters from the South by a Northern Man" (1817); and in 1818 he published his longest and best poem, "The Backwoodsman," thoroughly American in scenery, incidents, and sentiment. In 1819 he produced a second series of "Salmagundi," written wholly by himself, and in 1822 "A Sketch of Old England by a New England Man," followed in 1824 by a similar work entitled "John Bull in America, or the New Munchausen," purporting to be an English cockney's account of his tour in the United States. In 1823 appeared his first novel, "Koningsmarke," followed by "Merry Tales of the three Wise Men of Gotham" (1826); "The Traveller's Guide" (1828), subsequently called "The New Pilgrim's Progress" in consequence of a whimsical mistake as to the character of its contents; "Tales of the Good Woman" (1829), and the "Book of St. Nicholas" (1836), which were chiefly of a satirical character. "The Dutchman's Fireside" (1831), a story of the "old French war," and commonly regarded as his best work of fiction, passed through 6 editions in the course of a year, was republished in London, and translated into the French and Dutch languages. His next novel, "Westward Ho!" (1832), the scene of which is laid principally in Kentucky, also met with great success. In 1835 he published a "Life of Washington" for youth, and in the succeeding year a work entitled "Slavery in the United States," in which he defended that institution on social, economical, and physiological principles. In 1837, having for a number of years previous held the position of navy agent for the port of New York, he was appointed by President Van Buren secretary of the navy. In 1841 he retired to a country seat at Hyde Park on the Hudson river, where the remainder of his life was passed. He wrote two more novels, "The Old Continental, or the Price of Liberty" (1846), and "The Puritan and his Daughter" (1849). He also published anonymously an illustrated volume of stories entitled "A Gift from Fairy Land" (1838), and in conjunction with his son, William Irving Paulding, a volume of "American Comedies" (1847).

PAULICIANS, a sect of eastern Christians whose origin is somewhat obscure. Photius supposes that the sect began in the 4th century, and was a variety of Manichaeism, and that it took its name from one Paul, the son of Callinice, who with his brother John was its founder. Another tradition refers the name to Paul the Armenian, a later teacher of the sect. The most probable theory is that which derives the name from the apostle Paul. The probable founder of the sect was Constantine, a Marcionite preacher of Mananalis, near Samosata on the Euphrates, who took the name of Sylvanus, as that of one of Paul's companions (Silas), and established the precedent, afterward closely followed by the brethren of the sect, of assuming the names of those who were friends of the great apostle. After 27 years of labor, Constantine was put to death for the cause he had espoused, which had already assumed the proportions of a formidable heresy. The officer Simeon, sent to put the heresy down, became a convert, took the name of Titus, assumed the leadership of the sect, and was in his turn, after 3 years of toil, burned at the stake. His successor was Paul, under whose sons, Timothy and Theodore, the sect was rent by schism, Timothy holding to the transmission of spiritual gifts by apostolic succession, which Theodore rejected. Timothy (whose proper name was Gegnaesius), having adroitly managed to evade in his answers the charges of heresy, was able to continue his preaching for 30 years. On his death another schism arose. The sect had gradually increased and diffused itself, until it was found not only in Syria and Armenia, but in the provinces of Asia Minor. About the beginning of the 9th century, the conversion of the Galatian Sergius by a Paulician woman gave new life to the sect. Under the new name of Tychicus, he preached as an evangelist with indefatigable zeal in every part of Asia Minor, imitating the apostle not only in his discourse, but in his manner of life. His enemies accused him of arrogating worship to himself as the Paraclete. The Paulicians were now driven beyond the territories of the empire to find protection from the Saracens, and reprisals were made, until Sergius, though he had protested against this return of evil for evil, was in 835 assassinated by a fanatic named Tzanio. In spite of this persecution, however, the sect continued to grow and spread. Under the empress Theodora a new expedition was sent to exterminate them from Armenia, and 100,000 victims perished in this persecution. In 969 the emperor John Zimisces transported a large number of the sect to Philippopolis in Thrace, whence they were able to extend themselves in Europe, not justifying by any change of faith the emperor's hope of their conversion. A similar attempt by Alexis Comnenus a century later had hardly better success. The sect continued to flourish under other names, and the principles of the Paulicians were perpetuated by the Euchites, the Bogomiles, the Cathari, the Waldenses, and to some extent by the English disciples of Wycliffe.—The Paulicians held that the evil spirit, born of darkness and fire, was the creator of the lower world; that the soul of man, originally related to God, had been made liable to sin by its union with the flesh; that all men are capable of recovery; that Christ came down from heaven, bringing with him a body of finer mould, with which he passed back to heaven when his work of redemption was finished; that the mother of Christ was not sinless or a proper object of worship; that the cross was properly a symbol of Christ's diffusive love, and not of the curse which he bore or of his vicarious suffering. They denied the validity of the sacraments, interpreted spiritually baptism and the Lord's supper, would not recognize any priestly dignity, and insisted both in the ritual and in the households of the church upon simplicity of customs. They rated highly the study of Scripture, and especially honored those who would multiply and expound its record. They made no scruple of using falsehood in dealing with other sects, and were ready to deny their faith when interest served.—The ancient authorities on the history of the Paulicians are Photius, and Peter of Sicily, ambassador to Armenia of the emperor Basil (868).

PAULUS, Heinrich Eberhard Gottlob, a German Protestant theologian, born in Leonberg, Würtemberg, Sept. 1, 1761, died in Heidelberg, Aug. 10, 1851. He studied the oriental languages and divinity at Tübingen and Göttingen, and made a voyage to England to examine the manuscript treasures in the libraries of London and Oxford. On his return home in 1789 he was appointed professor of oriental languages at Jena, which position he exchanged in 1794 for the chair of theology in the same university. In 1804 he became professor of theology at Würzburg, and in 1811 taught exegesis and philosophy at Heidelberg. Among his works are: *Philologisch-kritischer und historischer Commentar über das Neue Testament* (1800–'4); *Das Leben Jesu* (1828); and *Exegetisches Handbuch über die drei ersten Evangelien* (1830).

PAUPERISM. In every organized community there has existed a class of persons obtaining their subsistence, partially or wholly, from public relief. The best method of repressing pauperism has been one of the most important topics of consideration in the political economy of all organized governments. Solon made provision against pauperism in his Athenian code, directing that the state should adopt the widows and orphans of those who fell in battle, and support those who were wounded or disabled. "It is better," says the Roman code, "that vagabonds should be left to die of hunger, than that they should be supported in their begging." Mendicity was discouraged and prohibited by Charlemagne and his successors, while liberal provision was made for the sick and suffering poor.—In England, all enactments for the suppression of beggary having failed of effect, the effort was made to confine the beggar to his birthplace, or to the parish in which he had acquired a settlement. He was prohibited from leaving it without a certificate from the parish magistrate, and if he did so was to be whipped and sent back. In his own parish he might beg, though he was liable to be compelled to work. The act 43 Elizabeth, c. 2 (1601), was a great advance on the previous poor laws, and remained in force without material modification till 1834. It directed the overseers of the poor in each parish to take measures for employing the children of all parents who were thought unable to maintain their children, as well as all such persons as, having no means to maintain themselves, did not practise any trade or labor to earn a living. For this purpose, a tax on real and personal estate was to be levied, and all lame, blind, old, and impotent persons were to be provided for; children were to be put out as apprentices, and a sufficient stock of flax, hemp, wool, and other material provided to set the poor at work. Poorhouses were to be built by the church wardens and overseers, to accommodate the impotent poor only. Persons possessing means were to be assessed for the support of their poor kindred. In cases of bastardy, the putative father was compelled to pay a certain sum weekly to the mother, and in default of payment was imprisoned. The effect of this provision was to make the income of the unmarried mother, in many instances, greater than that of the honest wife and mother; and as the parish supported the illegitimate children, it actually offered a premium to licentiousness. Under these provisions, the expense of the support of paupers increased. In 1801 the expenditure for this purpose was £4,017,871; in 1818 it had risen to £7,870,801, nearly doubling in 17 years. For the 16 following years it ranged from £6,000,000 to £7,000,000. The population of England and Wales in 1818 was 11,575,000, and the rate of poor relief per head to the population 6*s.* 0¾*d.* But such was the aversion of the people to change, that, although several successive commissions from 1801 to 1828 recommended plans of legislation, no material change was made in the poor laws. In 1828 another commission was appointed, and continued their investigations for several years. Their report in 1832 included a new system of poor laws, which became a law in 1834. Retaining the best features of the act of 1601, it further provides for a central board of 3 commissioners for the general superintendence and control of all bodies charged with the management of funds for the relief of the poor. Subordinate to these are 9 district commissioners, and the whole are subject to the direction of the secretary of state for the home department. The commissioners are empowered to order workhouses to be erected or hired, enlarged or altered, with the consent of a majority of the board of guardians. They may unite a number of parishes in a poor law union, for the purpose of a more economical and effective administration, but in such a way that each parish shall defray the actual cost of the support of its own poor. The parishes composing a poor law union elect their board of guardians, without the consent of a majority of whom money cannot be raised for building purposes; but the masters of the workhouses, and other paid officers, are under the orders of the commissioners, and removable by them. No wages are paid to the poor out of the poor rates, and except in extraordinary cases relief is only given to the able-bodied poor and their families within the walls of the workhouse, where labor is required of them in return for it. The provisions in regard to illegitimate children are intended to materially check bastardy. The putative father, if prosecuted, is required to pay the sum fixed by law (2*s.* 6*d.* per week) to the union instead of the mother, and mother and child are received into the workhouse. The children of paupers are educated in workhouse schools. In two years after its passage this law had reduced the cost of the relief of the poor 40 per cent. A similar system has been introduced into Ireland. The following statistics show the diminished cost of the relief for the poor at periods 30 years apart. Table II. also gives some data for a comparison of the relief to the poor in London with that in Paris and New York.

TABLE I.—STATISTICS OF PAUPERISM IN ENGLAND AND WALES IN 1859.

Estimated population of England in 1859	19,578,000
Amount of poor rate levied in 1859	£8,108,224
Receipts from other sources in aid of poor rate (parochial funds, legacies, earnings of paupers, &c.)	326,563
	£8,434,788
Of this sum there was appropriated directly to the relief of paupers (exclusive of expenditures for salaries of commissioners, erection of buildings, providing for special classes of the afflicted poor, medical relief, &c.)	£5,558,689
The whole number of paupers in England and Wales in 1859 was	902,052
Percentage of population	4.6
Of these there were in the union workhouses	107,050
" " outdoor poor	692,384
In hospitals, asylums, dispensaries, &c.	102,618
The number of insane paupers was	19,487
The expenditure for the relief of the poor solely, per head of the population, was	5*s.* 8*d.*=$1.37
The medical relief of the poor cost	£230,597
Of the sum expended directly for relief, there was paid for maintenance	18.02 per cent.
Ditto, in outdoor relief	58.00 "
Ditto, for pauper insane in asylums	6.08 "
Ditto, for salaries, interest, &c.	22.18 "
No. of poor law unions in 1858-'9	618
No. of parishes comprised in them	14,484
No. of single parishes not included	181

In 1818, the population of England being estimated at 11,575,000, the amount expended for the relief of the poor was £7,870,801, or an excess over 1859 of £2,312,112, while the population had increased meantime 8,003,000.

TABLE II.—LONDON VOLUNTARY CHARITIES IN 1859.

92 hospitals having an income of		£300,000
12 societies for preservation of life and health, benefiting 89,000 persons		40,000
17 penitent refuges and reformatories		2,500
15 charities for relief of the destitute, benefiting 150,000 persons		25,000
14 charities for poor debtors, widows, strangers, &c.		30,000
4 Jewish charities, exclusive of 20 minor Jewish charities		10,000
19 provident societies		9,000
27 pension societies, benefiting 1,600 persons		58,968
83 trade societies of a purely charitable kind		113,467
Carried forward		£588,935
Brought forward		£588,935
126 asylums for the aged, benefiting 3,000 persons		87,690
9 charities for the deaf and dumb, the blind, &c.		25,000
21 educational societies		72,247
31 educational asylums, benefiting 1,777 persons		45,465
60 home missions, some extending their operations beyond the metropolis		400,000
5 miscellaneous charities		8,234
Total income		£1,222,529
Legal relief of the poor.		
In the workhouses	32,640	
Outdoor poor	73,500	
Whole number relieved	106,140	
Population of London in 1859	2,362,236	
Proportion of paupers to population	1 to 22.2	
Expenditure for poor relief solely		£867,337
Aggregate of voluntary and legal relief		£2,089,866

Or 17*s.* 8*d.*=$4.28 to each inhabitant.

—In France, workhouses were established for the able-bodied poor in 1612, by a decree of Maria de' Medici, and it was directed that all mendicants should be confined in them and set to work. In spite of the workhouses, however, beggary continued to increase. In the reign of Louis XIV. the Bicêtre was founded as a combined hospital, asylum, and almshouse. In 1693 a terrible famine occurred in France, when 25,000 of the poor in Paris were utterly destitute, and mendicancy was necessarily permitted. Having once regained its foothold, it continued to be one of the crying evils of the country for the next 100 years. In 1790 workhouses were again established, and mendicity sternly prohibited. The decree of March 19, 1793, took the ground that the assistance of the poor was a national debt, and divided the funds appropriated to their relief as follows: the assistance of labor to the healthy poor, in time of dearth of labor or of calamity; assistance (in money or provisions) at home to the infirm poor, their children, the old, and the sick; hospitals for the sick who had no homes, or could not be cared for there; foundling hospitals and asylums for abandoned infants, the old, and the homeless infirm; and aid for unforeseen accidents. Napoleon I. forbade mendicity by severe laws. Soon after the accession of Louis Philippe to the throne a thorough investigation of the whole subject of pauperism was instituted, and the code revised, the basis of all assistance to the poor being the principle of inciting them to self-support. There are now fewer mendicants in France than in any other country in Europe. The able-bodied or healthy poor are assisted, where assistance is necessary, either at their homes or in workhouses (*dépôts de la mendicité*); the sick and infirm poor are abundantly provided for in 1,324 hospitals, asylums, and hospital asylums; and foundlings, orphans, and abandoned children, in foundling hospitals and orphan asylums. Yet there is a steady increase of able-bodied paupers in a larger proportion than the increase of the population. This increase in 1853, as compared with the 5 preceding years, was $\frac{8}{100}$ of 1 per cent. On the other hand, the number of the sick and infirm is gradually decreasing, the diminution being 2.26 in every 1,000 inhabitants in 1858, as compared with the 5 preceding years; and the number of foundlings and abandoned children in 1858, as compared with the 17 years preceding, had diminished 58 per cent. The following tables show the amount and kinds of relief to the poor in France in 1858, the latest year for which full returns have been made public:

TABLE III.—STATISTICS OF PAUPERISM IN FRANCE IN 1858, WITH COMPARISON OF PREVIOUS YEARS.

I. *Assistance to the Healthy Poor.*

Average annual number assisted from 1848 to 1852	962,516
Number assisted in 1858	1,022,996
Amount expended for their relief in 1858	$3,420,585
Percentage of the whole amount furnished in food, 1848–'52	45.25
Ditto, 1858	56.32
Percentage in clothing, 1858	6.44
Percentage in fuel, 1858	4.63
Percentage in money, 1858	20.45
Percentage of assistance to whole population in 1848–'52	2.78
Ditto, 1858	2.86
Average amount of assistance per head in 1848–'52	$2.23
Ditto, 1858	2.83

II. *Assistance to the sick and infirm Poor, in Hospitals, Asylums, and Hospital Asylums.*

Total number of hospitals and asylums in France	1,824
Hospitals for the sick alone	885
Asylums for the aged and infirm, or disabled	289
Hospital asylums, for insane, blind, deaf-mutes, idiots, &c.	650
Number of beds in all these institutions	181,016
Average annual admissions from 1848 to 1852	616,207
Admissions in 1858	542,828
Admissions per 1,000 inhabitants in 1848–'52	17.82
Admissions per 1,000 inhabitants in 1858	15.06
Total expense for 1858	$18,431,879
Daily average expense for each inmate	15.4 cts. to 17.1 cts.
Weekly average expense for each inmate	$1.08 to $1.20
In 1,085 of these institutions there were in 1858:	
Males	285,188
Females	162,885
Adults	404,447
Children under 15 years	42,926
Deaths in the asylums and asylum hospitals in 1858	9,216, or 9.71 per ct.
In the hospitals for the same year	8.01 "

III. *Children assisted, in Foundling Hospitals, Orphan Asylums, &c.*

Average annual number of children in asylums, or abandoned by their parents, in 1848–'52	125,518
Number in 1858	129,176
Annual expense of their support in 1848–'52	$1,571,127
" " " " 1858	$1,842,536
Annual expense per head in 1848–'52	$15.90
Weekly expense in 1848–'52	$0.30.6
Annual expense per head in 1858	$18.21
Weekly expense in 1853	$0.35
Of the children in asylums, &c., in 1858, there were:	
Foundlings	72,472
Abandoned by their parents or relatives	25,842
Orphans	6,460
Temporarily assisted	24,402
Proportion of these children to 1,000 inhabitants in 1845–'52	7.58
Ditto, 1858	8.58
Proportion to 100 births in 1845–'52	2.78
" " " 1853	1.87
Percentage of deaths in 1845–'52	10.66
" " 1858	8.16
Percentage withdrawn or indentured in 1845–'52	10.85
" " " 1853	12.50

Summing up these statistics, we have:

Assistance to the healthy poor	$3,848,536
Hospitals, asylums, and asylum hospitals	18,431,482
Foundling hospitals, orphan asylums, &c.	1,842,536
To which should be added (estimated by the government) for foreign paupers	1,851,000
Aid and suppression of mendicancy	1,158,000
Civil list, aid to institutions, pensions to wounded soldiers, &c.	6,755,000
Total	$27,886,554

The mutual relief societies of France do much to benefit the poor and prevent pauperism. The members are almost exclusively from the laboring classes. In 1859 there were of these societies:

Approved by government	2,274	
Authorized "	1,851	—4,125
The number of members was		584,283
Of whom were honorary members		61,873
The amount of funds held by these societies was		$5,558,993
Their annual receipts were in round numbers		$2,316,000
The population of France in 1856 was		36,012,669

The following statistics relative to pauperism in Paris are of interest:

Population of Paris, 1851		996,067
No. of outdoor poor assisted in 1852		77,999
No. of illegitimate births, in a total of 33,284, in 1852		10,958
No. of beds in the hospitals of Paris in 1852:		
In hospitals proper	6,743	
In asylums, &c.	9,828	
In foundling hospitals	599	—17,170
Cost of support of the hospitals, asylums, and asylum hospitals in Paris in 1852		$1,264,422
Cost of workhouses (*dépôts de la mendicité*)		847,432
Assistance to foreign paupers		280,477
Pensions and assistance		80,476
Total		$2,422,807

—Italy, Spain, and Portugal have been overrun with beggars from time immemorial. Holland and Belgium, too, have during the present century at least been remarkable for the number of their paupers. In 1855 the former country had 280,000 poor receiving assistance, or 1 to every 12 inhabitants; and the expenditure for their relief was about $2,500,000, or 71.4 cts. to every inhabitant. The religious denomination to which the pauper belongs is expected to sustain him, and it is only when their means are exhausted that the government steps in with its aid. Aside from this government assistance, there were 2,884 societies for aiding the poor at their homes, of which 356 were in the towns, and 2,528 in the country. Belgium has the reputation of being the poorest country in Europe; a large proportion of its peasantry never taste meat, but subsist on vegetables and the black bread of the country. In 1846 it had 699,857 paupers, or 1 to 6.20 inhabitants. East and West Flanders were the poorest portion of the kingdom, having 400,000 paupers to 1,400,000 inhabitants, or 1 to 3.5 inhabitants. There has been considerable improvement since 1846, and a large number are now in the almshouses, workhouses, and reformatories, who were formerly mendicants. Throughout the states of Germany (with the single exception, we believe, of Bavaria) mendicity is strictly prohibited, and the pauper is remanded generally to the parish where he was born, which is liable for his support, and employs him in its workhouse, if he is able to labor. In Bavaria there is a privileged class of beggars. In several of the states there is a poor fund, derived from the confiscation of the convents at the time of the reformation. In Sweden, each commune or parish is charged with the support of its resident poor, and in many of the parishes the foundations, legacies, and gifts for the relief of the poor are so large as to require very little additional taxation. The abandoned pauper, or one who has acquired no residence, is compelled to enter the army or navy, or, if unfit for either, must labor on the public works, or in a house of correction. In Denmark, assistance is regarded as an advance made to the pauper, which he must repay by his labor. The parish clergyman, the local director of the police, and one or more notables or property holders, constitute the board to which all applications for relief must be made. There are legal provisions for the relief of parishes which are overburned with paupers. In Russia, paupers have been of two kinds, serfs and free. The masters are compelled to provide for all the needs of the pauper serf. The serfs on the crown lands, if sick, must be supported by their families, or, if they are unable, by the parish. The parishes in the crown lands have erected almshouses and hospitals, which are partially endowed. The emancipation of the serfs, now in progress, will necessitate changes in the poor laws. In Turkey, among the Mohammedans, almsgiving is considered as equally a duty with prayer; the pious Moslem devotes the tenth of his income to the poor, and all the mosques have treasuries for their benefit. Most of the sultans have endowed hospitals and asylums for the sick, the infirm, the unfortunate, the insane, and the blind.—In the United States, different systems of management are adopted in different portions of the country. In New England, the general features of the English law of 1601, though without its perversions, are preserved. The resident paupers are cared for in the parishes or towns in which they were born or have gained a settlement. Sometimes, where a family seem likely to become paupers, their taxes are remitted for a series of years by the town officers, to prevent their gaining a settlement. In the smaller towns the able-bodied paupers receive only temporary and occasional relief, while the infirm, aged, or demented are provided for at a poorhouse, or a contract is made for their support with some citizen, who in bidding for it takes into account his ability to exact some labor from them. In the larger towns the poorhouses or almshouses have usually some land attached to them, and often workrooms for other simple labor, where such as are able to work are employed. Occasional and temporary assistance is also rendered to the outdoor poor at their homes, usually either in food or fuel, though sometimes in clothing and small sums of money. There are beside, in all the larger towns, beneficent societies, widows' societies, and orphan asylums, which aid in the relief of the poor; and the religious denominations to some extent provide for their own poor members. There are state almshouses for foreign paupers, or for those who, from any cause, have not gained a settlement. Table IV. gives the pauper statistics of Massachusetts for the years 1858 and 1859, which furnish a fair example of the New England system.

TABLE IV.—PAUPERISM IN MASSACHUSETTS.

	1858.	1859.
Number of almshouses	212	222
Acres of land appertaining to almshouses	21,296	21,601
Estimated value of almshouses and lands	$1,270,028	$1,300,671
Number of persons relieved in almshouses	11,845	10,369
Average number supported in almshouses	3,254	....
Average weekly cost of support of each pauper in the almshouses	$1.57	$1.47
Number of invalid poor in almshouses	2,283	1,980
Estimated value of pauper labor in the almshouses	$31,849	$21,060
Outdoor poor	23,071	21,954
Weekly average cost of outdoor poor per head	$1.10	$1.04
Number of paupers of foreign birth	12,440	....
Number who had gained a settlement in the state	14,016	11,783
Number of insane paupers	870	816
Number of idiotic paupers	306	326
Paupers in consequence of intemperance	13,885	17,809
Whole number of paupers in the state, exclusive of those in state almshouses	37,206	31,400
Net expenditure for the support of paupers	$550,620	$522,813
Indigent children under 14 years of age supported at public expense	....	1,892
In the State Almshouses, and Hospital at Rainsford's Island.		
Number at beginning of the year	2,240	2,037
Received during the year	7,616	5,831
Whole number	9,856	7,868
Discharged	7,095	5,651
Died	707	493
Average cost per head, per week, in the almshouses	$1.01	$1.00
Ditto at Rainsford's island	....	$2.49
Expenditure for support of these institutions	$170,604	$181,418
For state paupers not in almshouses	....	$82,519
Total expenditure of the state and towns for paupers	$720,624	$786,245
Population of Massachusetts in 1860	1,231,494	1,231,494
Rate per head of population of the expenditure for paupers	$0.58.5	$0.63.8

In New York, Pennsylvania, Ohio, and most of the older western and middle states, care of the poor devolves upon county officers. Each county has its almshouse, its workhouse, and its gaol, and the more populous ones often also an insane hospital. In these institutions the feeble and infirm or insane pauper is cared for, and the able-bodied compelled to work, usually on the county farm, which commonly consists of from 100 to 200 acres of land. The amount of labor accomplished is but little, and does not materially lessen the cost of support of the paupers. There is also provision for rendering temporary and occasional assistance to the outdoor poor. In New York, as the great receiving port of foreign immigration, a board of commissioners of emigration has been appointed by the state, who levy a tax of $2 on each immigrant arriving at the port, or require bonds from the owners of the immigrant ships that they shall not become chargeable to the state within 5 years. These commissioners have established on Ward's island, New York, a hospital, refuge, insane hospital, &c., where the foreign paupers arriving there are maintained till the 5 years are completed, when, if they still continue paupers, they are turned over to the state authorities. The commissioners of emigration are also liable for the maintenance of any for-

TABLE VI.—STATISTICS OF PAUPERISM IN THE CITY AND COUNTY OF NEW YORK FOR THE YEAR 1860.

Name of institution or department affording relief.	No. in charge, Jan. 1, 1860.	No. received during the year.	No. remaining Jan. 1, 1861.	Whole No. relieved during the year.	Males.	Females.	Children.	Natives.	Foreigners.	Whole amount of relief.	Cost per head per week.	Relief rendered in food.	Relief rendered in clothing.	Relief rendered in fuel, &c.	Relief rendered in medicine and medical attendance.	Relief rendered in money.	No. of deaths.	No. of births.	No. of insane and idiotic.
I. *Legal relief.*																			
Almshouse, Blackwell's island...	1,770	4,129	2,039	5,899	3,139	2,760	946	1,278	4,621	$79,842	$2.50	$42,662	$15,864	$18,978	....	....	455	..	200
Bellevue hospital...............	860	10,551	926	11,411	6,819	4,592	567	2,149	9,162	119,414	1.80	39,460	10,547	18,422	$10,168	....	1,018	474	15
City prison (insane paupers).....	..	..	..	859	425	434	20	..	..	....	..	....	....	....	....	....	34	3	859
City lunatic asylum, Blackwell's island.....................	711	401	754	1,112	448	664	21	236	876	92,361	1.57	18,675	15,899	14,549	....	....	118	..	754
Nursery, Randall's island........	1,142	1,897	1,153	2,539	218	148	2,173	*1,932	607	43,774	1.48	33,823	15,822	21,505	....	....	82	..	..
Nursery hospital, Randall's island	256	1,078	298	1,829	..	..	1,829	1,011	818	30,858	..	....	....	....	....	....	107	..	..
Workhouse, Blackwell's island...	1,387	11,641	1,427	13,028	5,249	7,779	..	4,364	8,664	38,961	1.55	35,279	25,607	18,006	....	....	21	..	..
Colored home....................	293	568	305	861	..	..	71	861	..	17,814	1.09	7,781	1,096	1,889	984	....	93	71	..
Colored orphan asylum...........	211	70	215	281	166	115	281	281	..	19,785	1.68	5,908	1,796	1,167	875	....	7	..	..
Island hospital, Blackwell's island	431	5,694	405	6,125	1,320	4,805	..	1,871	4,754	31,426	1.40	17,407	8,148	2,711	2,884	....	158	..	..
Small pox hospital, " "	16	328	43	339	204	135	..	118	221	8,454	2.66	1,118	254	608	364	....	36	..	..
Outdoor poor....................	..	..	..	79,780	Adults 33,679		46,101	†39,449	40,331	107,848	..	....	....	32,736	....	$28,585	....	..	..
Total of legal relief..........	7,077	36,847	7,565	123,568	Adults 73,049		51,509	53,050	69,554	$624,482	$1.75	$89,938	$202,078	$120,016	$14,775	$28,585	2,119	548	1,828
II. *Relief by voluntary charitable associations.*																			
Association for improving the condition of the poor........	..	..	..	35,942	..	..	..	14 p. ct.	86 p. ct.	$40,566	..	....	....	....	....	....	..	..	..
Five public dispensaries.........	..	..	..	184,069	59,266	74,808	54,799	58,749	75,320	21,812	..	....	....	....	$21,812	....	969	..	..
Four homœopathic dispensaries..	..	..	..	6,654	..	..	..	..	..	1,850	..	....	....	....	1,850	....	28	..	..
Other dispens'ies and infirm'ies..	..	..	..	17,465	..	..	..	..	..	18,185	..	....	....	....	18,185	....	..	..	..
Free beds occupied at hospitals..	..	..	..	2,789	..	..	..	..	..	78,169	$3.39	$58,185	....	....	8,799	....	985	..	..
Home for the friendless..........	156	1,201	174	1,357	..	929	428	..	..	20,106	..	4,986	$758	$1,708	....	$361	22	..	..
Five Points house of industry....	120	1,255	140	1,335	778	557	1,092	896	639	18,040	1.69	1,243	750	20	10	767	2	..	2
Five Points ladies' mission......	236	464	240	700	..	..	..	..	..	7,891	..	291	296	208	145	253	..	..	..
Fourth ward mission.............	110	800	384	910	180	204	384	19	369	6,651	‡0.56	2,453	898	....	....	....	12	..	..
Children's aid society...........	..	..	..	804	604	200	756	502	302	15,084	..	....	....	....	....	....	..	..	..
Industrial schools..............	..	..	..	4,472	..	..	..	..	..	81,312	..	....	....	....	....	....	..	..	..
Widows' societies§..............	..	..	..	4,224	..	..	..	..	..	102,561	..	....	....	....	....	....	..	..	..
Orphan asylums..................	2,311	1,639	2,404	3,960	..	..	3,960	..	..	185,922	1.42	87,969	....	....	....	....	50	..	..
Other institutions..............	..	..	..	6,799	..	..	..	..	..	44,070	..	....	....	....	....	....	..	..	..
Total of voluntary charities..	..	..	..	221,080	..	..	..	..	..	$586,119	..	....	....	....	....	....	..	..	..
III. *Relief by commissioners of emigration.*																			
Total assistance by commiss'ers..	..	..	..	20,715	..	..	..	..	..	$206,064	..	....	....	....	....	....	..	..	..
Refuge and hospital, Ward's isl'd.	764	3,965	1,068	4,729	2,848	1,881	557	422	4,307	58,918	$1.57	$26,065	$2,782	$18,378	$18,192	$5,825	226	264	204

* A large proportion of these (not less than two thirds) are children of foreigners.
‡ Meals only.

† Seven ninths of these were children, and mostly of foreign parents.
§ Partly estimated.

eign paupers who, within the 5 years, have become chargeable to any of the county almshouses of the state. The state has also provided for the treatment of the pauper insane, and the instruction of young deaf and dumb, blind, and idiotic paupers.

TABLE V.—PAUPERISM IN THE STATE OF NEW YORK (exclusive of New York and Albany counties).

	1858.	1859.
Land attached to co. almshouses, acres	7,208	7,691
Present est'd value of almshouses.....	$1,059,840	....
Number of persons relieved in almshouses..........................	88,582	86,550
Average number supported in ditto..	18,422	18,431
Of these there were males...........	7,203	7,042
" " females.........	6,219	6,889
Average w'kly expense of each pauper.	$0.90.5	$0.71.8
Ditto above earnings	$0.89.5	$0.67.35
Value of labor of paupers............	$29,485	$30,887
Amount expended for almshouse relief	$884,120	$774,107
Outdoor poor permanently dependent	222,578	191,967
Outdoor poor receiving temporary and occasional relief..................	207,207	279,787
Amount expended for outdoor poor...	$607,271	$560,860
Expended for relief solely...........	547,412	....
Weekly average cost of relief to outdoor poor per head................	$0.4.8	$0.4.9
Of those permanently dependent, there were:		
Foreigners.......................	....	45,485
Insane paupers....................	1,838	2,669
Idiots............................	487	868
Mutes.............................	86	48
Born in almshouses..................	849	812
Died in almshouses..................	2,584	2,428
Paupers in consequence of intemperance................................	....	84,048
Pauper children under 16 years of age	5,821	2,972
Entire expenditure for support of paupers..............................	$1,491,891	$1,334,967
Population of the state of New York in 1860 (except as above)...........	2,921,880	2,921,880
Ratio per head of population of the expenditure for the poor...........	$0.51.5	$0.45.7
Population of New York city in 1860.	814,267	814,287
Amount of county relief to the poor in New York city (almshouse department)........................	$632,563	$542,941
Ratio per head of population of the expenditure for the poor in New York city.........................	$0.77.6	$0.66.6
Population of New York state except Albany co. in 1860................	8,735,607	8,735,607
Ratio per head of population of the expenditure for the poor in the entire state, except Albany co........	$0.56.6	$0.50.2

In the city of New York, the charge of the poor and of criminals is in the hands of a board of 4 commissioners of charities and corrections, under whose care are the Bellevue hospital, in the city; the almshouses, workhouses, insane asylum, island hospital, small pox hospital, and penitentiary, on Blackwell's island; 4 city prisons on New York island; the Randall's island nursery, and the nursery hospital, on Randall's island; and the city cemetery, on Ward's island; the charge of the outdoor poor and partially of the colored home and colored orphan asylum. There are also in the city a great number of societies and institutions having for their object the relief of the poor, or of particular classes of them. We have endeavored to bring the statistics of these together, so as to exhibit at one view the public charities of the city. (See table VI. on the preceding page.) It will be observed that a large majority of those receiving relief are either of foreign birth or but one remove from it. Yet notwithstanding this very large foreign element, exceeding, according to the best authorities, 75 per cent. of the whole number of paupers, the cost for the support and relief of the poor is in proportion to the population less than half in the state, and even in the city of New York but about half, that of England. In the slaveholding states, the obligation of the master to support the aged, sick, feeble, infirm, or mentally disordered slave, has obviated to a considerable degree the necessity of pauper laws. The state government, or the county authorities, in case of general loss of bread crops, appropriate a specified sum, to be raised by tax, and apportioned to the poor either in money or breadstuffs. In the new states, the poor laws are not in all cases fully digested and in successful operation, but they are generally on the model of those of New York and Ohio.—See Dr. R. Burn, "The History of the Poor Laws" (8vo., London, 1764); Sir F. M. Eden, "The State of the Poor, or History of the Laboring Classes in England from the Conquest" (8 vols. 4to., London, 1797); Sir George Nicholl, "Histories of the English, Scotch, and Irish Poor Laws" (4 vols., London, 1854–'6); Stephen Colwell, "Themes for the Protestant Clergy, by a Layman" (Philadelphia, 1855); C. de Brouckère, *La charité et l'assistance publique* (Brussels); H. A. Frégier, *Des classes dangereuses de la population dans les grandes villes* (2 vols. 8vo., Paris, 1840); Christophe Moreau, *Du problème de la misère et de sa solution* (8 vols. 8vo., Paris, 1851).

PAUSANIAS, a Spartan general, son of Cleombrotus and nephew of Leonidas, belonging to the Agid branch of the royal family. He succeeded his father as guardian of the young king Plistarchus, the son of Leonidas, which office he retained until his death. He first comes into notice as leader of the combined forces of the Greeks in the great battle at Platæa against the Persians under Mardonius in 479 B. C. The successful result of the battle gave him so high a reputation, that in 478 he was chosen commander of the fleet destined to act against the Persians. The armament first sailed against Cyprus, and restored to freedom most of the cities of that island, and then turning to the Thracian Bosporus reduced Byzantium. The natural insolence of Pausanias now became conspicuous. After the battle of Platæa he had besieged Thebes, and having obtained possession of Timagenidas, a leader of the Medizing faction, had carried him to Corinth and put him to death without trial. In the tripod dedicated at Delphi by the victorious Greeks, he styled himself alone as the leader of the Greeks and destroyer of the Persians; which inscription was subsequently erased by the Lacedæmonians themselves, who substituted in place of his name the names of the confederate nations engaged in the battle. Upon the capture of Byzantium he connived at the escape of the Persian prisoners, who carried a letter to Xerxes, offering to bring under his dominion Sparta and the rest of Greece, and demanding in return the hand of his daughter in marriage, and that a confidential person should be sent to the seaboard, through whom to correspond. The Persian monarch acceded to these propositions, promising to furnish as much money and as many men as would be needed, and sending Artabazus down to treat with him. Pausanias now became more arrogant than ever. He assumed the Persian dress, imitated the luxurious conduct of the Persian chiefs, and journeyed through Thrace with a body of Persian and Egyptian guards. His treasonable course at length came to the ears of the Spartans, and he was recalled; but although put upon trial, there was no evidence sufficient to convict him of treachery. Under pretence of taking part in the war, he now sailed to Byzantium, and, resuming his correspondence with Artabazus, so conducted himself that the Athenians expelled him from the city. He then retired to Colonnæ in Troas, where he continued his communications with the Persians, until he received a peremptory order from Sparta to return. Upon his arrival he was immediately imprisoned, but soon released on his demand for trial, in which he trusted to clear himself by the use of money. Much was suspected, but inasmuch as nothing serious could be proved, he remained at liberty and prosecuted his designs, and to carry them out tampered with the helots, to whom he offered freedom and the rights of citizenship. Although some of the helots themselves divulged the plot, the ephors feared to take decisive measures against a man of his position. At length an Argilian slave, who was intrusted with a letter to Artabazus, noticing that none of the previous messengers had come back, broke the seal and discovered that he was to be put to death. He immediately showed the letter to the ephors, and by their direction took refuge in the temple of Neptune at Tænarus, where two of the ephors hid themselves. There they heard the conversation of Pausanias with his slave, which left no doubt of his guilt. As he was about to be arrested in the street, he fled to the temple of Athena Chalciœcus, where he was walled in, his own mother being said to have laid one of the first stones for this purpose. He was carried out as he was dying to save the temple from pollution. The date of his death is later than 471 B. C. He left 3 sons, of whom Plistoanax became one of the kings of Sparta.

PAUSANIAS, a Greek topographer, supposed to have been born in Lydia. Nothing is known of his life except what he himself tells us, and from him we learn that he was engaged on a part of his work in the time of Antoninus Pius, who died A. D. 161, and wrote his 8th book during the latter part of the reign of Marcus Aurelius, which closed in 180. His work is entitled Της ʽΕλλαδος Περιηγησις, "Itinerary of Greece," which is divided into 10 books, and comprises descriptions of the whole of Peloponnesus and of the most interesting parts of Hellas proper. The minuteness and completeness of his descriptions prove that he must have visited personally all or nearly all the places which he describes, and it is also probable that he had visited the islands of the Ægean, Rome, Palestine, and other parts of Syria. His books are chiefly taken up with descriptions of antiquities, statues, pictures, and public edifices, and the physical peculiarities of the countries in which he travelled. All the mythological tales connected with these are narrated. The general fidelity of his topographical description has been thoroughly tested by modern authors. The first edition of his work, which was exceedingly incorrect, was printed by Aldus at Venice (fol., 1516). Since then there have been several, of which the latest are those of J. H. C. Schubart and C. Walz (3 vols. 8vo., Leipsic, 1838–'40), and of Dindorf (Paris, 1845). The "Itinerary" was translated into English by Thomas Taylor (3 vols. 8vo., London, 1793–'4).

PAUSIAS, a Greek painter, a native and resident of Sicyon, who flourished between 360 and 330 B. C. He was instructed by Pamphilus, and was a contemporary of Aristides, Melanthius, and Apelles. Pliny says that he was particularly distinguished as a painter in encaustic with the *cestrum*, and he is believed to have been the first to decorate the ceilings and walls of houses in this style. He was fond of painting small pictures of boys, and from his intimacy with Glycera, a flower girl, whose portrait by him is highly extolled by Pliny, he acquired great skill in flower painting. Another celebrated painting by him, representing a sacrifice, and remarkable for the foreshortening of the victim and the strong relief of the surrounding figures, was preserved in the portico of Pompey at Rome. This style of painting is said to have originated with Pausias. The greater part of his paintings were probably transported to Rome when Sicyon was obliged, in order to pay her debts, to part with all her art treasures which were public property.

PAUW, CORNELIUS DE, sometimes called NICOLAS, a Dutch historical writer, born in Amsterdam in 1739, died in Xanten in 1799. He was educated at Göttingen, and obtained through the influence of his brother-in-law, the father of the revolutionist Anacharsis Clootz, the office of canon of Xanten, in the duchy of Cleves. Subsequently he was made reader to Frederic II. of Prussia. He wrote several works in French, one of which was *Recherches sur les Américains* (8vo., Berlin, 1770 and 1772), designed to prove "the native inferiority of the savage Americans." In the parts relating to Paraguay he bitterly assailed the Jesuits, and his attacks on them made him unpopular with the Catholic clergy. Another work, *Recherches sur les Égyptiens et les Chinois* (2 vols. 8vo., Berlin, 1774; translated into English by Capt. J. Thomson, 2 vols. 8vo., London, 1795), was designed to prove "that no two nations ever resembled each other less than the Egyptians and the Chinese." In this treatise he observes that both nations were condemned "to an eternal mediocrity." His *Recherches sur les Grecs* (2 vols. 8vo., Berlin, 1787) was translated into English (London, 1793). In consequence of the invasion of the duchy of Cleves by the French revolutionary army, Pauw became subject to melancholy, and burned his *Recherches sur les Germains*, which was never published. Although a man of great learning and ability, he was exceedingly dogmatic in all his writings.

PAVEMENT (Lat. *pavimentum*, from *pavio*, to beat or ram down), a hard covering of stone, iron, wood, brick, cement, or asphaltum and sand for roads, walks, and floors of houses. As stated by Beckmann, the earliest mention of paved highways is of those prepared by Semiramis, according to the inscription which she set up, recorded by Valerius Maximus, lib. iii. cap. 7. Isidorus states that the Carthaginians had the first paved roads. The streets of Rome were not paved in the time of its kings; but the Appian way was constructed by Appius Claudius 193 years after their expulsion; and many of the streets are known to have been paved with stone in the 4th and 5th centuries after the building of the city. Pavements of blocks of lava worn into ruts by the wheels of carriages are met with in Herculaneum and Pompeii. From the descriptions of pavements given by Vitruvius, together with the poem of Statius on the Via Domitiana and the fragments of ancient paving still remaining, a very clear idea may be formed of the care given by the Romans to the construction of their famous roads. These were laid out with a width of from 8 to 15 feet by excavating a shallow trench along each side. The space between these was then dug down to a solid bed, or if this could not be reached piles were driven, upon which the materials of the road might be supported. The lowest course was of broken stones, none smaller than the fist; over these was a course 9 inches thick of rubble work, or broken stones cemented with lime, well rammed; over this was a course 6 inches thick of finer materials, chiefly broken bricks and pieces of pottery, also cemented with lime; and upon this was laid the *pavimentum*, which consisted of large polygonal blocks of the hardest silicious stones, sometimes of basaltic lava, of irregular form and nicely fitted together in a sort of mosaic. In the cities the slabs of stone were sometimes of rectangular form and of softer material, as in the forum of Trajan, which was paved with travertine. In every instance great care was taken to fit the stones to each other so as to produce a perfectly even surface. Stones corresponding to curb stones were sometimes set up to sustain a narrow gravel walk on each side of the road, and some of these were raised so as to serve for mounting blocks for travellers on horseback. The Romans continued to give great attention to the maintenance of the public ways in the city and of the military roads, many of which were constructed with immense labor through hills and masses of rock, and, by bridges and embankments, through swamps and across ravines and rivers. The floors of Roman houses were paved with pieces of bricks, tiles, stones, &c.; sometimes with tiles ground to powder and mixed in with mortar; and again with pieces of marble imbedded in a cement ground, and well beaten or rammed down, whence the name *pavimentum*. Mosaic pavements were first made in the time of Sylla, by whom, according to Pliny, one was constructed in the temple of Fortune at Præneste. They became very common in the houses of Pompeii, and were there produced with great taste in a variety of beautiful patterns, in marble of different colors, in tiles, and even glass, set in a fine cement and laid upon a deep bed of mortar. Some of the designs were of figures and scenes in actual life, being really pictures in mosaic. An account was presented to the British association in 1850, by Prof. Buckman, of an ancient Roman pavement discovered at Cirencester, in which appeared a medallion of Flora with a head dress and flowers of verdigris green when first uncovered. This being scraped off, the portion of the pavement beneath was found to be a beautiful ruby glass, the color of which was derived from peroxide of copper, and this by decomposition had become converted externally into the green carbonate of copper.—Though the paved roads of the ancient Romans surpass all other structures of the kind that have been made by civilized nations since their time, there are found in Peru remains of works of a similar kind of unknown age, and exceeding them in grandeur and extent. Such were the great roads from Quito to Cuzco, and continued south toward Chili, laid out through mountainous and almost impassable regions for distances variously estimated from 1,500 to 2,000 m., and about 20 feet in breadth. "They were built of heavy flags of freestone, and in some parts at least covered with a bituminous cement, which time has made harder than the stone itself." (Prescott, "Conquest of Peru," vol. i. p. 63.) In Central America, among the ruins of Palenque, are also found pavements of large square blocks of stone constructed with great skill and nicety.—In Europe during the middle ages comparatively little attention was given to the paving of streets and roads. Cordova in Spain was paved in 850 by Abderrahman II., the 4th caliph. Streets in Paris were first paved in 1184 by Philip Augustus. The improvement extended over the "Cross of Paris," as it was called—two principal streets crossing each other at right angles. In 1832, in excavating for a sewer in the rue St. Denis, this ancient pavement was met with about 8 inches below the surface. It consisted of blocks of stone about 4 inches long and 7 thick. A few inches below this was found the still more ancient roadway of gravel of the period of the Roman emperors. Many of the streets of Lon don were in a perilous condition by reason of deep pits and sloughs even as late as the 16th and 17th centuries. Holborn was paved by royal command in 1417; but the great market of Smithfield remained without pavement 200 years longer.—In modern times various methods and materials of paving have been employed. In Holland all the streets are paved with bricks, and these are also used for the same purpose in Venice. They obviously lack the strength and durability required for the passage over them of heavy loads. In other cities, instead of the broad flat stones used by the Romans, rounded pebbles of a few inches diameter, called cobble stones, found among the gravel of the diluvium or along sea and river beaches, have been very generally used. These, when of hard stone, closely set, and well rammed down in a bed of gravel or sand, form an economical and very durable pavement, one which gives secure footing to horses and is easily repaired. It is objectionable on account of the rattling noise of the vehicles drawn over it; and in the great thoroughfares of large cities, it has been found almost essential to substitute for it a pavement of rectangular blocks of granite, trap, or other hard rock. Blocks of wood have been at times in some repute, but they have proved objectionable on account of soon becoming slippery, particularly when wet, and also of their tendency to decay. They were commonly cut in hexagonal prisms and set upright, so that the wear came across the ends of the grain. Hemlock, being a cheap wood, was generally selected for the purpose. This pavement is not now, however, in use, and wood was quite given up in America and in Europe, when a new method of applying it was introduced into Boston in 1848 by Mr. Samuel Nicholson. He laid a pavement of spruce blocks, 3 inches square, in alternate lengths of 8 and 4 inches, so as to form a checkered surface, a depression of 4 inches lying at each side of each of the taller blocks. These depressions were then filled up to the level of the top of the long blocks with coarse pebbles or small fragments of stone. After being rammed, boiling pine tar was poured over the whole surface, which penetrated the loose materials and the substance of the wood also. A layer of sand about an inch deep was then spread over the surface and rammed. He also laid the 8 inch blocks in rows close together, interposing between each row a strip of inch board, 4 inches high; and in the space of one inch thus made between each row of blocks, the same application of fragments of stone, tar, and sand was made as before. In some instances the blocks were treenailed or pinned together; but this was not considered important, particularly if a flooring of boards was laid upon the foundation of concrete of coal tar, lime, and sand, which in all cases was prepared for the blocks. The specimens of pavement thus prepared continued in use for 7 years, upon a road over which heavy loads were constantly passing, without requiring any repair. The pavement has since been laid in other streets in Boston, and also in Chicago and other cities of the United States; and it is highly recommended for its durability, the secure footing it affords to horses, and its freedom from noise. On account of its keeping long in good repair, it is regarded as not comparatively an expensive pavement. Mr. Nicholson found its cost in Boston was sometimes a little under and sometimes a little over $2 per square yard, allowing nothing for the patent right. At the West it is found better to use hard wood instead of hemlock, pine, or spruce, though no doubt at increased cost. The wood may also be advantageously protected from decay by kyanizing or by the application of the solution of chloride of zinc. In use it is found that the fibres become slightly opened at the surface by the blows from the feet of the horses, and the sand ground in by these and the pressure of the wheels contributes not a little to the preservation of the wood. The foundation of concrete laid upon and covered by coal tar forms an impervious covering to the soil, protecting the atmosphere from unwholesome emanations. A pavement not much unlike the Nicholson pavement has been introduced into London, and is very highly recommended in a report made to the commissioners of the Holborn board of works, May 10, 1858, by Mr. Braithwaite, who pronounces it superior to every other paving material that has come under his notice. It is made of alternate rows of creosoted wood and broken granite cemented together with asphaltum. ("Mechanics' Magazine," vol. lxviii., p. 584, London, 1858.)—The result of a great number of experiments in paving in New York is the selection of what is called the Belgian pavement, as combining in the highest degree the advantages of economy in construction, durability, and a secure footing for horses. It is formed of blocks of a bluish trap rock made slightly pyramidal in form, which are placed with the base of the pyramid upward, exposing a face of 4 to 6 inches in each direction. The stone is found in great abundance along the Hudson river opposite New York, the formation being the same with that of the Palisades which appear further up the river. It is remarkably well adapted on account of its extreme toughness and hardness to resist wear, and it presents always a sufficiently rough surface to prevent horses from slipping. The streets of Naples are said to be paved with stone of this character, and notwithstanding the continuous use of the pavement for 1,000 years it has hardly been worn one inch in depth. The cost of this pavement in New York is from $1.86 to $2.50 per square yard. In this respect it is much to be preferred to the "Russ pavement," with which Broadway has been covered at an expense of not less than $6 per square yard. This is of cubical blocks of hard greenstone from Staten island or of trap from New Jersey, of about one foot square. In use it has been found that blocks of this size wear smooth, causing horses frequently to slip and fall; and much expense has already been incurred in either removing the blocks and substituting others of smaller size, or in grooving them upon the surface. In laying the stones, the first requisite is to obtain a good foundation; and in situations where the ground is not springy, all that is necessary is, after the removal of the superficial earth, to spread upon the natural bed beneath either a layer of dry sand, or first a layer of broken stones, which should be well rammed, and upon this the stratum of sand in which the paving stones are to be imbedded. In some instances the foundation is prepared with a bed of concrete, upon which the pavement is laid; and in France the most durable pavements are made by covering the old with sand and gravel in which the new stones are bedded. It is important to remove all earthy matters which could be converted into mud by infiltration of water; for its freezing and thawing would inevitably lift the stones, and destroy the pavement. Whenever a stone from any cause is depressed below the level of the adjoining stones, it receives heavier shocks from the wheels which pass over it, and its displacement goes on with accelerated velocity. The bed therefore must be uniformly solid, and the stones uniformly hard, and set together as closely as possible. Over the whole when finished sufficient sand is spread to fill all the interstices, into which it soon finds its way. An arched form is given to the paved floor, the sides abutting against the gutter and curb stones, which should be sufficiently deep or well backed to prevent any spreading. In using rectangular blocks, they are laid in courses running diagonally across the street for the purpose of preventing the formation of ruts, which might soon appear along the edges of stones lying in longitudinal courses. The duration of stone pavements varies greatly according to the materials employed and modes of construction. In the most frequented streets of Paris good pavements have been renewed as often as once in 6 years, and others badly constructed once in 3 years; but where the amount of travel is not very great, the pavement has lasted 20 years without renewal. The material largely used in Paris for paving is a somewhat friable sandstone from Fontainebleau. This is hardened by immersing it in liquid bitumen, and it is thus rendered much more durable, while the pavement is also made more compact and impervious to water.—Blocks of cast iron have been tried with considerable success both in England and in American cities. Various forms have been given to them with the view of securing the greatest strength and diffusing the weight over the largest surface. They are made rough on the upper side by grooves or short projecting points, so that they afford a firm footing to horses. But for the expense of this pavement, it would probably be preferred to any other.—For stables, gardens, and footwalks, the English have employed caoutchouc to some extent. The court of entrance of Windsor castle, and the stables of the dock yard at Woolwich, are thus paved.

PAVIA, a N. province of the kingdom of Italy, comprising the former Lombard province of Pavia and the Piedmontese districts of Bobbio, Lomellina, and Voghera; area, 1,290 sq. m.; pop. in 1858, 410,146. It is watered by the Po, the Ticino, and the Olona, and the canals of Bereguardo and Pavia and the Naviglio Grande pass through its boundaries. The country is generally level, and the soil fertile. Much attention is paid to the raising of silk and the breeding of cattle, and much of the cheese called Parmesan is made here. The climate is not very healthy. By the peace of Villafranca, July 11, 1859, Pavia, along with the other provinces of Lombardy, was ceded to France, and by that power transferred to Sardinia.—The capital, PAVIA (anc. *Ticinum*), is situated on an eminence on the left bank of the Ticino, not far from the spot where that river falls into the Po, and 19 m. S. S. W. from Milan; pop. 25,006. It is about 1 m. in extent each way, and is surrounded by an old wall. A communication with the suburb on the other side of the river is made by a covered bridge of 8 arches built in 1351. From this bridge the principal thoroughfare, called the Strada Nuova or Corso, extends through the city. Pavia was at one time remarkable for the magnificence of its buildings, and for its numerous lofty square towers, designed for ornament, or used as prisons or strongholds, whence it was called "the city of a hundred towers." Of the edifices now remaining, one of the most noteworthy is the cathedral, begun in 1488 and still unfinished, in a side chapel of which is the magnificent tomb of St. Augustine. The church of San Michele, a Lombard building 189 feet long by 81 feet wide, was finished during the 7th century. Santa Maria del Carmine, an immense Italian Gothic church built in 1373, is a remarkable specimen of the finest brickwork; and the church of San Francesco is of the same style and material. The celebrated church of San Pietro in Cielo d'Oro, which contained the tomb of Boëthius, is now mostly in ruins, the portion in good preservation being used as a storehouse. Of the few towers remaining, those of Belcredi and Maino are most deserving of mention, each being about 190 feet high. About 4 m. N. of the city is the most magnificent monastery in the world, the Certosa of Pavia, founded in 1396 by Giovanni Galeazzo Visconti, the first duke of Milan. The university of Pavia is the most ancient in Italy, and is said to have been founded by Charlemagne in 774; but it received its greatest impulse from the patronage of Galeazzo Visconti. It has a library of about 50,000 volumes, a collection of coins, a museum of anatomical preparations and of specimens of natural history, and a botanic garden instituted by the French; and there is also attached a school of the fine arts.

Of the two colleges now belonging to the university, the Collegio Borromeo educates about 40 students, and the Collegio Ghislieri about 60. The professors receive salaries varying from $600 to $1,200 per annum. Among the distinguished men who have been instructors here may be mentioned Vesalius, Cardan, Spallanzani, Volta, Scarfa, and Tamburini. In 1858-'4 the number of professors belonging to the university was 85, the number of assistants 21, and the number of pupils 1,423. Pavia is a bishop's see, and contains a theatre, a gymnasium, 2 hospitals, and charitable institutions. —Although at the end of the Roman republic Ticinum was a place of considerable importance, it is mentioned first by the geographers and historians of the empire. In A. D. 452 it was taken by Attila; but Theodoric, king of the Ostrogoths, rebuilt and fortified it, and erected a palace. During the Gothic wars it was the principal stronghold of that people in northern Italy, and there the royal treasury and valuables were kept; and so well fortified had it been, that during the Lombard invasion it resisted for 3 years a siege by Alboin. Taken by him in 570, the Lombard monarchs chose it for their residence, and it remained the capital of their kingdom until 774, when Desiderius, the last Lombard king, after a siege of 15 months, was obliged to submit to Charlemagne. Before this time it had begun to be called Papia, probably from the fact that Ticinum when it became a municipal town was enrolled in the Papian tribe. During the middle ages, the city underwent many vicissitudes; it was at one time an independent republic, at another ruled over by tyrants, and again subject to the authority of the Viscontis of Milan. It is chiefly memorable in modern history for the battle fought under its walls Feb. 24, 1525, between the French under Francis I. and the imperialists under Marshal Lannoy, in which the former were defeated and nearly destroyed, and their king taken prisoner. In 1527 and 1528 Pavia was twice taken by the French and laid waste. In 1796 it was stormed and pillaged by Napoleon, after an insurrection in which his garrison had been expelled. It came by the peace of 1814 into the possession of Austria, and so remained until 1859.

PAWN, a word undoubtedly derived from the Latin *pignus*, and meaning any article of personal property given in pledge, or by way of security for the payment of a debt, or the discharge of an obligation. The word is also used as a verb, and signifies to give such article in pawn or in pledge. It is a bailment, because the essence of the transaction is the delivery of the pawn by the pawnor to the pawnee. The first question that arises is, therefore: In what class of bailments is a pawn to be placed, in reference to the obligations of care on the part of the bailee? The answer is obvious; the bailment of pawn is a bailment for the benefit of both parties. The pawnor obtains credit or delay or other indulgence, and the pawnee obtains security. Therefore the bailee (or pawnee) is bound only to ordinary care, that is, not to the extreme care to which he would be bound if the benefit were all his own; but it is not enough if he takes the slight care of it which would discharge his duty and shield him from responsibility if the benefit were all the bailor's, the bailee himself deriving none from the transaction. Hence a pawnee is answerable for the loss of the pawn or for injury to it, only when there has been an absence on his part of ordinary care, which the law defines as that care which a man of ordinary prudence would take of his own property of like kind and under similar circumstances. If therefore the pledge be lost by some intrinsic defect, the operation of which might possibly have been prevented, or by some casualty which might possibly have been avoided, or by a superior force or violence which might have been resisted, the pawnee is nevertheless not responsible, unless he was wanting in the ordinary care above described.—A pawnee has a property in the pledge, but it is special, not absolute. It is sufficient to maintain an action against a third party for injury to or abduction of the pledge; and a judgment in such an action, when brought either by the pawnor or the pawnee, would be a bar to another action brought by the other.—A pawnee has only a right to hold the pledge; therefore, if he uses it, he does so at his own peril; and if the thing be lost or injured during such use, the pawnee is responsible, although the loss occurs wholly without neglect on his part. So, too, if he derive a profit from this use, he must account for this use of it unless the use was equally for the benefit of the pawnor. Thus, if the pawn be a horse, the pawnee may use it enough to preserve the health of the horse, and for this use make no compensation; but if he take a journey with the horse, he must allow the usual price. In all cases, the pawnee must account for income or profits derived from the pledge; and if he is put to extraordinary expense or trouble for the benefit of the pledge, or to preserve its value, although this would be for his own benefit also, he may charge the owner and pawnor for all this, unless there be a bargain to the contrary express or implied.—From what has been said it will be seen that if the pledge be stolen, the pawnee is not liable unless there was neglect on his part; but the question is at once important and difficult, as to the legal presumption of neglect or care. By the civil law, the presumption was against the pawnee; that is, if the pledge were stolen from him, he was responsible unless he could prove that there had been no neglect on his part. There are reasons for supposing that the law of England and of the United States is otherwise; and that if a pawnee can prove that the pledge was stolen from him, this will make it the loss of the owner, unless the owner can prove neglect or default on the part of the pawnee.—The distinction between a mortgage and a pledge has not been regarded as of much moment, nor has it been sharply defined, until of late; but recent adjudications, especially in New York, have given to it very great importance. Nothing is more common now than the giving of personal property, and especially of choses in action, as promissory notes, and of stock or scrip of incorporated companies, by way of security for loans or debts. Now this giving of security may be regarded as a mortgage or as a pledge. But if it be a mortgage, the parties acquire one set of rights, and come under one set of obligations; and if it be not a mortgage, but a pledge, their rights and their obligations are very different. The reason of this is, that it is of the essence of a pledge, that the thing pledged should pass at once into the possession of the pawnee, the property in the thing remaining in the pawnor. But if it be a mortgage, the property in the thing passes at once to the mortgagee, while the possession may and often does remain with the mortgageor. By property, in law, we mean what no other word expresses precisely, and none perhaps so nearly as ownership; the above rule therefore, if put into less technical phrase, might be expressed thus. A pawnor retains the ownership of the pledge, but places it in the possession of the pawnee as his security. But a mortgageor transfers at once the ownership of the property, retaining only a right to annul and defeat this transfer by payment of a certain debt. (See Mortgage.) Now the practical effect of this difference, which gives to it its importance, is this. A mortgagee, who acquires the property in or the ownership of the thing mortgaged, may do with that thing whatever he may do with his own. He may sell it, or mortgage it, or keep it in his own hands, always subject however to the mortgageor's right to redeem it; and it makes no difference to the mortgageor whether, when he comes to pay the debt and redeem the thing mortgaged, he finds it in one hand or another. But as a pawnee acquires no ownership whatever, he cannot sell the thing pawned, nor pledge it over, nor transfer it in any way. His whole right consists in the right of possession. He may keep the pawn as a security for his debt, because the owner has lost, not the right of property, but the right of possession; but the pawnee can do nothing else with it. Nor is this all; for he not only may, but must keep the pawn in his possession. This is his bargain with the pawnor by construction of law; and he holds the pawn only on this condition. If therefore the pawnee, for any reason or in any way, voluntarily parts with the possession of the pawn by transferring it to a third person, his lien or right of possession is at once gone; the pawnor at once recovers his right of possession, and may demand and repossess himself of the pawn, although the debt to secure which it was given remains wholly unpaid. The custom of brokers and others, who lend money or give other accommodation on the security of pledged stocks, has been the reverse of this. One holding such stock by way of security has regarded himself only as bound to have that stock ready to be returned when the debt is paid, and in the mean time he does what he pleases with it; that is, he sells it, or transfers it by way of pledge, or makes use of it as of his own. But recent decisions in New York have declared that by such use the right of the pledgee to hold the stock is wholly lost. The pledger may therefore demand it at once, although his debt be not paid; and if it be not forthwith redelivered to him, he may have his action for damages, and in this action recover its value at the time of the demand, and perhaps (for this is not quite settled) any higher value it may have reached at any time while in the pawnee's hands. (Wilson vs. Little, 1 Sandford 351, and 2 Comstock 443; Allen vs. Dykers, 3 Hill 593, and 7 Hill 498.) This severe and somewhat technical rule is recent, and may need general confirmation before it can be regarded as established law. But there is for it this substantial reason. If a pawnee may use in this way stock pledged to him, he forces upon the pawnor the risk of his insolvency at the time when the stock should be redelivered. For if the pawnee be then insolvent, without the stock in his hands, the pawnor has only a claim against him for its value, and must take his dividend with other creditors. But if the pawnee retains in his hands the stock as the pawnor's stock, the pawnor then retakes it as his property.—A pledger may always transfer the pawn, but subject to the pawnee's claim; and if the transferee pay the debt, the pawnee must deliver the pawn to the transferee. The pawnee holds the pawn only as security, nor does it become absolutely his own if the debt be not paid at maturity. There is no forfeiture of the pawnor's right to redeem, until something has been done which is the same thing in its effect that foreclosure is in a case of mortgage. What this thing is may not be, in all cases and in all respects, quite certain. There is no doubt that the pawnee may apply to a court of equity and have a decree of sale, and may thereupon sell the pawn in compliance with the terms of the decree. Some authorities hold, or rather intimate that this, which was the ancient and regular way, if not the only one, remains at this day the best and safest. But we are satisfied that it is not necessary, and certainly it is not usual. We consider it as now established law, that a pawnee, after the maturity of the debt, and after unsatisfied demand, may sell the pawn, provided he do so in good faith and with all reasonable precautions in favor of the pawnor's interest. There is perhaps no other way of doing this, which satisfies the law, than a sale by public auction; and at all events this is the surest and most proper way. Nor will a sale by auction be conclusive against the pawnor, unless it is conducted, as to time, place, advertisement, notice to the pawnor, and in all other respects and circumstances, in such wise as to indicate perfect good faith, and to secure a due regard to the rights of the pawnor. The proceeds must be applied to the payment of the debt. If any balance remains over, that must be given forthwith to the pawnor. If any portion of the debt remains unpaid, the pawnee has an equally valid claim to that amount as he had originally for the whole. It is not unfrequent for the parties to agree, when the pledge is made, as to what shall be done with it; as, for example, that the pawnee may, if the debt be unpaid at a certain time, sell the pawn, if it consist of stocks, at the brokers' board. But any such agreement must be complied with literally and accurately. Thus, it would give no right to make any use of the stocks before maturity of the debt; nor to sell them without previous demand, nor in any other way than at the brokers' board. (See cases cited before.) It should be remarked, however, that negotiable bills and notes come under an exceptional rule. When they are pledged, it is said that the pledgee has much more power as to the use and disposition of them than of stocks; but this exception is not very accurately defined. So it should be said, that although delivery of possession is absolutely essential to the contract of pledge, and if the pledgee voluntarily parts with his possession he loses all lien or right to hold the pawn, this does not apply where the pawnee, in good faith, for a special reason, and for a limited time, returns the pawn to the pawnor, reserving all his rights over it. The pawnor may in that case be regarded as the agent of the pawnee, and as holding it for him. A pawnee, who takes a pawn as security for a specific debt or debts, cannot hold it as security for other debts from the pawnor, unless by a bargain between them.—It may be added that until a comparatively recent date, nothing seems to have been given in pawn, at least within the recognition of the common law, but personal chattels. But now personal property of all descriptions, all choses in action, and even patent rights or copyrights, may be given either in pawn or in mortgage.

PAWNEES, a tribe of Indians (4,500 in 1858) inhabiting the country on the river Platte and its northern tributaries. They were visited by Bourgmont in 1724, at which time they occupied their present position; but until after the acquisition of Louisiana their existence was scarcely known to the people of the United States. They raise corn and vegetables, and their hunting ground once extended as far south as the Arkansas river, and as far west as the sources of the Platte. Their language is different from that of the neighboring tribes. They are remarkable for endurance, daring, craft, and skill in horse stealing.

PAWTUCKET, a town of Providence co., R. I., on both sides of Pawtucket river, 4 m. N. from Providence; pop. in 1860, 8,880. Until 1861 this town was partly in Massachusetts; but by an agreement recently completed, the eastern boundary has been entirely changed and the whole of Pawtucket annexed to Rhode Island. The river has here a fall of 50 feet, supplying extensive water power. The first cotton manufactory in the country was established here by Samuel Slater in 1790, and for 40 years the place held the first rank among the manufacturing towns of the country. It now contains 18 cotton mills, 9 machine shops, 3 furnaces, 4 brass and copper founderies, 2 nut, bolt, and tool establishments, and 3 of jewelry, beside other manufactories of belting, leather, cabinet ware, hair cloth, tin, carriages, &c. There are also an extensive calico printing establishment and a manufactory of fire engines famous throughout the country. It contains 11 churches, 1 public library, 2 printing offices, 4 banks, 3 institutions for savings, and 2 public halls. During 1860, 200 vessels, chiefly laden with lumber, coal, and cotton, arrived. The town is beautifully situated, and has a most picturesque appearance, its stone bridge and waterfall adding to the effect of the scene. It has direct communication with Boston by the Boston and Providence railroad, and with Worcester by the Providence and Worcester railroad.

PAX (Lat., peace), an instrument anciently used in the Roman Catholic church, and retained for some time in the church of England. In the early ages of Christianity it was customary for the faithful at certain parts of the divine service to practise literally St. Paul's recommendation: "Greet ye one another with an holy kiss," as appears from the "Apostolical Constitutions" (viii. 11): "Let the bishop salute the church and say, 'The peace of God be with you all;' and let the people answer, 'And with thy spirit.' Then let the deacon say to all, 'Salute one another with a holy kiss;' and let the clergy kiss the bishop, and the laymen the laymen, and the women the women." But in course of time, when the separation of the sexes in the church ceased to be observed, a small tablet called the *pax*, the *tabula pacis* (tablet of peace), or the *osculatorium*, was kissed first by the bishop, then by the inferior clergy, and finally by the people. The ceremony called giving the pax, as performed in Roman Catholic churches at the present day, is merely a relic of the old custom. Just before the communion at solemn high masses the officiating clergyman turns to the deacon, and extending his hands and touching him on the arms, inclines his head toward the deacon's left shoulder, saying: *Pax tecum* ("Peace be with thee"); to which the deacon answers: *Et cum spiritu tuo* ("And with thy spirit"). The deacon gives the pax in the same manner to the sub-deacon, and each of the inferior ministers to the one next below him in dignity. The people have no part in it.

PAXTON, Sir Joseph, an English horticulturist and architect, born at Milton-Bryant, near Woburn, Bedfordshire, in 1803. His education was obtained at the Woburn free school; but his parents being in humble circumstances, he was early obliged to rely upon himself for support. Obtaining a situation at Chiswick, the suburban villa of the duke of Devonshire, he gained the confidence of that nobleman, who transferred him to Chatsworth, and subsequently made him the manager of his Derbyshire estates, and superintendent of the works which rendered Chatsworth the most celebrated country seat in England. In 1851 he laid before the building committee of the great industrial exhibition his plan of the crystal palace, and the design proposed by him was adopted and the work carried on under his superintendence. For this service Paxton was knighted. Since the completion of this edifice he has pursued the profession of an architect to some extent, and has been engaged in a variety of commercial enterprises. He constructed the greatly enlarged and remodelled crystal palace at Sydenham, and had the entire charge of laying out the pleasure grounds, fountains, &c., of that unique enterprise. In 1854 he was elected a member of parliament from Coventry, and in 1857 was reëlected. He was elected fellow of the horticultural society in 1826, and fellow of the Linnæan society in 1833; and in 1844 the emperor of Russia created him a knight of the order of St. Vladimir. He has written a "Practical Treatise on the Culture of the Dahlia" (1838), and a "Cottage Calendar," beside editing or assisting in editing "Paxton's Flower Garden," "Pocket Botanical Dictionary," "Horticultural Register," and the "Botanical Magazine."

PAYMENT, in law, is the discharge of a debt by a delivery of the amount due; and it is, of course, the most direct and most proper discharge of it, and the most complete defence against any claim founded upon it. The party entitled to receive the money may give notice to him who should pay it, that he requires the payment to be made directly to himself, and then no other payment discharges the debt; but without such notice, payment may be effectually made in the ordinary course of business to the creditor's general agent, or to his attorney. But the agent or attorney must be agent for that purpose. Hence payment to a man's wife, child, servant, clerk, or even attorney or auctioneer, has not the effect of a payment to the party himself, unless this authority to receive the money be shown; but it may be shown indirectly, by usage or other circumstances. Here, however, another general principle of agency comes in; and if the party receiving the money bears to the party paying it all the appearance of agency and authority, and this by the act or consent of the creditor, it is the same thing as if he were actually the agent. So an actual agent can receive payment only according to his authority; thus, if he is authorized to receive payment of a debt in money and receives it in goods or by note, and gives a receipt therefor, the principal is not bound by the receipt.—If there be joint creditors, as if two or more persons deposit money in a bank to their joint credit, a payment to either of them without the consent of the other does not discharge the debt. It is said, however, that payment to either of two or more joint executors discharges the debt; but payment to one of two or more joint assignees in insolvency, without the consent of the others, does not discharge the debt. In general, payment to a trustee is valid as against any claim of the party having the beneficial interest in the trust, even if he be defrauded by the trustee, unless the person paying be a party to the fraud or consent to it.—Formerly, a payment of a part of a debt was no satisfaction of the whole, even if that were agreed upon; the reason being that the creditor who promised to give up a large debt, all of which was due to him, on the payment of a part only, made the promise without legal consideration. Now, however, it seems to be established, that a fair and well understood compromise of a debt, honestly carried into effect, is a complete payment or discharge of the debt. Still, if a creditor compel payment of a part of his debt by process of law, when he might as well have sued for all, as if, when the several instalments are all due, he sues for one or two only, this will bar his claim for the remainder, because he has no right to put his debtor to the cost and trouble of repeated and unnecessary litigation.—Payment of money is often made by letter; and some difficult questions have arisen under this mode of payment. The law may, however, be stated thus. If the money reaches the creditor, the debtor is of course discharged. If it does not, he is still discharged if he was directed by the creditor to make the payment in this way, or if he can derive such authority from the certain and unquestionable course or usage of business; but not otherwise. The same rule or principle would apply, if the creditor sent the money, not by mail, but by an expressman, or by a private carrier.—As paper money or bank notes are in universal use in this country, and payment is generally made by them, the law on this subject is of much importance. The questions are: If the notes are forged, where is the loss? If the notes are genuine but the bank is insolvent, where is the loss? In the first place, it will be seen in the article TENDER, that any one to whom bank notes are offered in payment may refuse them and demand specie. If he accepts them, and they are forgeries, they do not discharge the debt, being considered in law mere nullities. If they are genuine, but not good by reason of the insolvency of the bank, the rules of law are more uncertain. It may be said, however, that generally, and where there is no fraud or negligence on either side, the loss in such cases falls on the party paying, and he must make up the difference between the actual and the nominal value of the notes. If the debtor knew of the insolvency and did not disclose it, here of course is fraud, and the debtor is at once liable. And if the debtor did not actually know the insolvency, but had sufficient means of knowing it, and must be considered as ignorant of it either through design or by negligence, such ignorance would affect him as knowledge would do. Still, however, the general rule, which casts the loss upon the debtor where there is no fraud or fault attending the payment, must be so far qualified, as that if the creditor receiving the money, by his subsequent negligence, as by receiving and retaining the notes without any inquiry or notice, prevents the debtor from profiting by any remedy or indemnity he might have had if due notice had been given him, the loss to this extent must fall on the creditor.—Payment is also often made by the debtor drawing his check upon a bank for the amount due, or by his presenting to the creditor some other man's check which he holds. Now a check is a draft, and, being payable to order or to bearer, is negotiable either by indorsement or by delivery; and it is in most respects embraced within the law of promissory notes and bills of exchange. (See NEGOTIABLE PAPER.) If the creditor draws the money, then of course payment is made. But if he fails to receive the money, it is no payment, unless this failure be his own fault; for he must not be negligent with it. It need not be presented on the day on which it was received, but it must be presented within a reasonable time thereafter; for if the bank would have paid it when it was drawn, but the check was kept a week, and then the bank failed, the creditor loses the money by this unreasonable delay. What delay is excusable, and what is not, is not settled by any positive rule, but is determined in each case by its own circumstances. If the drawer had no funds in the bank, and no adequate arrangement for funds, when he drew the check, it need not be presented at all in order to bind him, because the drawing of such a check, and using it as payment, was itself a fraud upon the creditor.—Payment is sometimes made by note; and if this be a negotiable note, it may be an absolute payment, discharging the original debt, and leaving the creditor no claim excepting on the note itself. The law of Massachusetts was quite peculiar in this respect; and as this was the law of Maine when they formed but one state, it continued to be the law of Maine after their separation. At present some part of this peculiarity remains. It may be said, however, to be the law of those two states, that if negotiable paper is given for the amount of a debt, the presumption of law is that it was given and received as payment thereof; but this presumption may be rebutted by proof that the parties did not so understand it. But in England and in all the other states, and in the courts of the United States, the presumption of law is against the note being a payment of the debt, without affirmative proof that it was so understood and intended.—Payment is sometimes made to a third party, to be held by him until some question is determined or some right ascertained. Such a third party becomes a stakeholder. For the rights and duties of a stakeholder in a case of wager, see WAGER. But one may be a stakeholder in other ways. Thus an auctioneer may receive from a purchaser a sum of money by way of deposit or security, to be kept by him until the title to the property bought can be investigated; and to pay it over to the seller if that be good, or to the purchaser if it be bad. If such a stakeholder pays the money over before the question is determined, he pays it in his own wrong, and at his own peril; for it is his duty simply to hold the money. And it is said that if such stakeholder pays the money to a creditor before his right is determined, the depositor may at once sue him and recover the money without any reference to the state of the question between the creditor and himself. But if the deposit be made by check, the stakeholder may draw the money, and hold it or even use it, without making himself liable for the amount.—The law of appropriation of payments is of much importance. It determines the right of applying a payment in one way or in another, or to one debt or to another. The general rule, upon which all others are founded, is, that whoever pays money may direct the appropriation as he pleases; or, in other words, pay it on such account as he chooses. But if the party paying the money makes no such appropriation, the party receiving it may make such application of it as he pleases. And if neither party make any specific appropriation (and an appropriation may be made in various ways), it rests with the law to make it according as the justice and equity of the whole case may require. These rules are held to apply even where the debts are of very different descriptions. Thus, if A owes B $100 on a bond, and as much more on a note, and as much more on simple book account, and pays $100, the appropriation of this payment shall be determined to one or other of these debts, in accordance with the above rules. As the payer may certainly appropriate the money as he will, if he declines doing so, this gives the payee the power of appropriating it at his pleasure, although in a way adverse to the payer. Thus, if A's wife owed money to B before marriage, and A also owes B, and A pays B a sum of money without specific appropriation, B may apply the money to the debt of A's wife. So, if A owes B two debts, one of which is more than 6 years old and so is barred, and the other is not, and pays money without appropriation, B may apply it to the debt which A was not legally compellable to pay; but he cannot by such appropriation revive the remainder of the barred debt, and then make B pay the balance. The appropriation, to have full force, must be made at or very near the time when the money is paid. For if either party, at some subsequent period, finds out what will be to his advantage, and then undertakes to make such a disposition of it, this will not avail him to the disadvantage of the other; but the law will consider this as a case in which it must make an appropriation because the parties did not. So also an appropriation by either party will not affect the other party unless it be communicated to him. Thus, mere entries in the books of either party do not affect the other party; but if these entries were shown to the other party, then they bind him. And although the payment be general, the creditor cannot make the appropriation, provided the debts due to him are due in different rights. Thus if A, as executor of C, owes B a debt, and also owes him a private and personal debt, and pays money generally, B must appropriate it first to the payment of the private and personal debt. Nor has the creditor the right of appropriation merely because the debtor did not make an appropriation, if the payment were made in such a way as to prevent the debtor from appropriating it; as on his account by some other person, or in any way which impaired his power of exercising his right.—Where the court makes the appropriation because the parties do not, it will generally favor the creditor so far as to apply it to the most precarious and least secured debt. But if there be two or more debts, and the sum paid will exactly discharge one of them, the court will consider that it was intended to pay that debt. If one of the debts be contingent or uncertain, as if B were the surety of A and might be bound to pay a certain sum if A did not, and A also owed B a certain and specific sum, and A pays a sum generally, B will not be permitted to hold it against his own suretyship, but must apply it to the specific debt. On the other hand, a court sometimes protects a surety, and, in his favor, will direct an appropriation of money paid generally; as if A buys goods of B, and C is the surety of A, and A pays to B money generally, B will be obliged, in justice to C, to apply the money to payment for the goods.—Payments are sometimes made by a debtor, not voluntarily, but by compulsion of law, or by his assignees. In such case there is no appropriation by either party, but the payment is applied to all the debts in proportion to their amount.

PAYNE, John Howard, an American actor and dramatist, born in New York, June 9, 1792, died in Tunis, June 5, 1852. He evinced in early youth a remarkable predilection for the stage, together with considerable literary precocity. At 13 years of age, while a clerk in a mercantile house in New York, he secretly edited a little periodical called the "Thespian Mirror," and showed so much ability in this capacity that a benevolent gentleman named Seaman offered to defray the expenses of his education at Union college. The bankruptcy of his father led to his departure from this institution before completing the collegiate course, and as a means of supporting the family he went upon the stage, making his debut at the Park theatre, New York, Feb. 24, 1809, as "Young Norval." The performance was entirely successful, and he subsequently appeared before large and enthusiastic audiences in Boston, Philadelphia, Baltimore, and elsewhere. In 1813 he visited England, and made his first appearance at Drury Lane theatre in the same year as Master Payne, the "American Roscius," in his original part of Young Norval. Both here and in the provinces his performances called forth much applause, and he was generally admitted to be superior to Master Betty and other youthful actors in similar parts. For nearly 20 years after this he pursued a career of varied success in England, as actor, manager, and playwright. He made translations of French dramas, and produced a number of original plays and adaptations, including "Brutus," "Thérèse, or the Orphan of Geneva," and "Clari," all of which proved highly successful, although but a small share of the profits came to the author. The first, produced in 1818, with Edmund Kean in the principal part, was made up in a great measure from 7 different plays on the subject, and still holds possession of the stage. "Clari," which was produced as an opera, contains the celebrated song "Home, Sweet Home" (written when he was near starving in an attic in the Palais Royal in Paris), which alone will preserve Payne's name from oblivion, and of which 100,000 copies were sold in a single year. Another successful play by him was "Charles the Second," the principal part in which was a favorite with Charles Kemble. In 1832 he returned to the United States; and after employing himself several years in literary pursuits, he received the appointment of American consul at Tunis, which office he held at the time of his death.

PAYSON, Edward, an American clergyman, born in Rindge, N. H., July 25, 1783, died in Portland, Me., Oct. 22, 1827. He was the son of a clergyman in his native town, was graduated at Harvard college in 1803, and then for 3 years took charge of an academy in Portland. In Sept. 1806, he became a member of the Congregational church in Rindge. While in Portland he had given much attention to theological studies, and, upon quitting his situation as teacher, pursued them under the direction of his father, paying especial attention to the critical study of the Bible. On May 20, 1807, he was licensed to preach, and on Dec. 16 was ordained colleague of the Rev. Mr. Kellogg, pastor of the Congregational church in Portland. There he remained till his death, although his health failed shortly after his acceptance of the post, and was never completely reëstablished. He declined in 1825 a call to Boston, and also in Jan. 1826 one to New York. He published "A Discourse before the Bible Society of Maine" (1814); "A Thanksgiving Sermon" (1820); "An Address to Seamen" (1821); and "A Sermon before the Marine Bible Society of Boston and its Vicinity" (1824). His works have been collected in

3 vols. 8vo., with a memoir of his life by the Rev. Asa Cummings, D.D.

PEA (Celtic, *pis*; Lat. *pisum*), a well known exogenous plant with diadelphous blossoms, whose seeds are employed for food. The several species of the pea are annual herbs with abruptly pinnate, tendril-bearing leaves, each having 3 pairs of leaflets and large foliaceous stipules; papilionaceous flowers, the calyx with 5 foliaceous segments, the 2 superior of which are the shortest; the corolla of 5 irregular petals, the upper or odd one (*vexillum*) ample and reflexed; the style carinated, villose above; the fruit a pod (legume), oblong, rather compressed, but not winged; seeds globose, numerous, with a roundish eye (*hilum*); cotyledons large and thick. The common pea (*pisum sativum*, Linn.) is a hardy annual, native of the south of Europe, and has been for a long time under cultivation. It has a weak stem, which supports itself by tendrils; terete petioles bearing 3 pairs of ovate, entire, glaucous leaflets with undulated margins, usually opposite and mucronulate, ovate, somewhat cordate, stipules crenated at their base; 2- or many-flowered peduncles, and rather fleshy legumes. The usual color of the flowers is white, but sometimes red. There are 5 principal and quite distinct forms of the common pea, and from these have originated many varieties; they are *saccharatum* (Seringe) or sugar pea, with a tall stem, legumes rather coriaceous, between terete and compressed, and seeds globose and distant; *macrocarpum*, with a large stem, large falcate legume, very much compressed, and not coriaceous, every part being edible, and large distant seeds; *umbellatum*, with quadrifid, acute stipule, many-flowered peduncles, terminal, and somewhat umbellate (the English crown pea); *quadratum* (Linn.), with very dense and square seeds (the *pois carré* of the French); and *humile*, with a weak and dwarf stem, legumes smaller and rather coriaceous, seeds approximate and roundish (usually known as the dwarf pea). Don gives the names of 24 varieties of the common pea used for sowing in European gardens; but 5 especially are highly recommended by the best horticulturists, viz.: the early frame, early Charlton, blue Prussian (prolific and superior, and suited for middle crops), blue imperial (a dwarf, fine, rich pea), and Knight's marrowfat (a tall and luxuriant grower, rich-flavored, and of the latest crop). The following named varieties are preferred in the United States, and come into bearing in the order in which they are here designated, viz.: Dan O'Rourke, blue imperial, champion of England, and marrowfat.—Peas seem to prefer a moderately rich, warm soil, and one not recently manured. When needed for early use, they are sometimes sown on a sunny border, sheltered by a high wall. Sometimes likewise they are forced by beginning at the time of sowing with a temperature of 40° to 50° F., and gradually rising to 60°, and after the flowering increasing the heat to 70°. In the spring, in order to forward the crop, the earliest sorts may be sown in pots and transplanted into rows, after they have grown an inch or more high. The sorts known to agriculturists as field peas are also numerous, but the principal are the gray and the white; and the best kinds of splitting peas are considered to be the "pearl" and the "Suffolk."—The pea, like the other members of the natural order of *leguminosæ*, is rich in nutriment, and is nitrogenous in its elements. Sir Humphry Davy found in 1,000 parts of pea flour 574 parts of nutritive matter, consisting of 501 parts of mucilage, 22 sugar, 35 gluten, and 16 insoluble extract. The pea is subject to the attack of a coleopterous insect known as the *bruchus pisi*, or pea weevil; the parent insect, visiting the young pods when the enclosed seeds are beginning to swell, deposits a tiny egg in the punctures it effects opposite to the pea; this is hatched into a grub, and this in turn is changed into the mature weevil toward the end of the year. Such seed peas are called buggy, and previous to sowing should be scalded. The stems and leaves are also attacked by a species of mildew which covers them with a filamentous and grayish web, impeding further growth of the plants. Deep and thorough watering at the roots will if applied in season remedy this evil, but usually the injury is too extensive before being discovered.—The sea pea (*P. maritimum*, Linn.) occurs on the sea beaches of England; its seeds, though bitter and disagreeable, have been eaten in times of scarcity and afforded relief. Several beautiful blossoming garden plants, known as everlasting pea, Tangier pea, and sweet pea, are species of *lathyrus*, a closely allied genus, but not employed for culture as table esculents.

PEABODY, Andrew Preston, D.D., an American clergyman and scholar, born in Beverly, Mass., March 19, 1811. He was graduated at Harvard college in 1826, at the age of 15. The 3 years subsequent to graduation were spent by him in teaching, and the 3 following years as a student in the Cambridge divinity school; and in 1832-'3 he was a tutor in mathematics in the college. On Oct. 23, 1833, he was ordained in the south parish church in Portsmouth, N. H., as colleague pastor with the Rev. Nathan Parker, D.D., whose death a fortnight later left him in sole charge of the parish, which he retained until Sept. 1, 1860. He then became preacher and Plummer professor of Christian morals in Harvard university, from which in 1852 he had received the degree of D.D. Dr. Peabody has been an industrious literary worker, as a contributor to periodical literature, and a lecturer for lyceums. He was for several years a leading writer in the "American Monthly" and the "New England Magazine," and for a long period one of the principal contributors to the "Christian Examiner." His connection with the "North American Review" in one or another capacity has been uninterrupted for nearly a quarter of a century, and since 1852 he has been its editor. He has also published more than 100 sermons, orations, tracts, and pamphlets of various kinds, a volume of "Lectures on Christian Doctrine," which has passed through 6 editions, and "Sermons of Consolation," which has passed through 3 editions.

PEABODY, GEORGE, an American merchant, born in Danvers, Mass., Feb. 18, 1795. His parents were poor, and his early education was acquired in the district schools. At the age of 11 he was placed as clerk with a grocer in his native town, but left him when he had attained his 15th year, and, after spending a year with his grandfather in Thetford, Vt., went to Newburyport as clerk for his elder brother, who had opened a dry goods shop there. The shop being consumed by fire, he next went with an uncle to Georgetown, D. C., where for the following two years the business was conducted in his name, though a minor. Finding himself in danger, if he continued in this relation, of being held responsible for debts he had not contracted, he withdrew from the business in 1814, and became a partner of Mr. Elisha Riggs in the wholesale dry goods trade, Mr. Riggs furnishing the necessary capital, and intrusting the management to Mr. Peabody. The next year the house was removed to Baltimore, where it soon attracted a large business, and in 1822 branch houses were established in New York and Philadelphia. In 1827 Mr. Peabody crossed the Atlantic for the first time to buy goods. In 1829, by the retirement of Mr. Riggs, he became senior partner in the house. More than once, on his visits to Europe, he was intrusted with important negotiations by the state of Maryland, which were invariably conducted with success. Early in 1837 he took up his residence permanently in England. In 1843 he withdrew from the firm of Peabody, Riggs, and co., and established himself in London as a merchant and banker. Through his exertions, the confidence in American responsibility, which had well nigh failed in the disastrous period of 1837, was maintained. He rendered repeated and important favors in this respect to the state of Maryland, which were gratefully acknowledged, but for which he refused all compensation. The house he established in London has been ever since its foundation the head-quarters of his countrymen in that city, and the centre of American news and intelligence. In 1852, at the bi-centennial anniversary of his native town of Danvers, he sent a toast in a sealed envelope, not to be opened till the day of the anniversary. That toast was: "Education a debt from the present to future generations;" and in order to pay his share of that debt, a check for $20,000 was enclosed, to be expended in the founding of an institute, lyceum, and library for the town. By subsequent gifts that amount has been increased to $60,000, and an additional $10,000 has been bestowed upon North Danvers, for a branch library. To the first Grinnell expedition to the Arctic ocean, he contributed $10,000. In 1856–'7 he gave the sum of $300,000, with a pledge to increase it to $500,000, to found an institute in Baltimore for the promotion of science, literature, and the fine arts.

PEABODY, WILLIAM BOURN OLIVER, an American clergyman, born in Exeter, N. H., July 9, 1799, died in Springfield, Mass., May 28, 1847. He received his education at Exeter academy and at Harvard college, where he was graduated in 1817. Subsequently he studied for the ministry under the elder Dr. Henry Ware in the theological school attached to the same institution, commenced preaching in 1819, and in Oct. 1820 was ordained pastor of a Unitarian society in Springfield, Mass., with which he remained connected until his death. A man of fine tastes and extensive knowledge, he was particularly well versed in the principles of landscape gardening, and in several departments of natural history; and to his exertions Springfield is mainly indebted for a cemetery ranking among the most beautiful in the country. He also did much to awaken a taste for natural history, through lectures at home and contributions to the "North American Review" on forest trees, insects, and birds. In connection with this subject he prepared at the request of the Massachusetts legislature a "Report on the Birds of the Commonwealth," which did much to arrest the wanton destruction of birds, and to convince the public of the important part they play in the economy of nature; and he also contributed a memoir of Alexander Wilson, the ornithologist, to Sparks's "American Biography." He was a frequent contributor to the religious and secular press, and wrote a few hymns and sacred poems of merit. A memoir of him by his brother, the Rev. O. W. B. Peabody, with selections from his sermons, and a volume of his essays and reviews, have appeared since his death.—OLIVER WILLIAM BOURN, twin brother of the preceding, died in Burlington, Vt., July 5, 1847. He was graduated at Harvard college in 1817, subsequently practised law for a number of years in Exeter, N. H., during which time he edited the "Rockingham Gazette and Exeter News Letter," and in 1822 removed to Boston, where he coöperated with his brother-in-law, Mr. A. H. Everett, in the editorship of the "North American Review." At the same time he was for several years assistant editor of the "Boston Daily Advertiser." In 1842 he accepted the professorship of English literature in Jefferson college, La., hoping to repair his shattered health by a residence in a milder climate. Failing in this, he returned to Boston; and in 1845, in compliance with a desire long entertained, he was licensed to preach by the Unitarian association of Boston. He soon after became the minister of a congregation in Burlington, Vt., in which office he continued during the remainder of his life.

PEACE RIVER. See HUDSON'S BAY TERRITORY, vol. ix. p. 324.

PEACH, a delicious and well known fruit originating in Persia, and for a long period familiar to horticulturists. The peach tree (*amygdalus Persica*, Linn.) has been found growing wild in various parts of Turkey in Asia, and seems to flourish best under cultivation between lat. 30° and 40° N., extending even further N. in the United States. The peach tree belongs to the natural order *drupaceæ* or almondworts, according to Lindley, which are trees or shrubs with simple, alternate leaves, usually bearing glands toward their base; simple and mostly glandular stipules; white or rose-colored flowers, either produced singly or in umbels, the calyx 5-toothed, deciduous, lined with a disk; the petals 5, perigynous; the stamens about 20, arising from the throat of the calyx; the anthers innate, 2-celled, bursting longitudinally; styles terminal with a furrow on one side, ending in a uniform stigma; the fruit a drupe with the nut (putamen) sometimes separating spontaneously from the flesh (sarcocarp), seeds mostly solitary; cotyledons thick, plano-convex; albumen none. To this order belong many valuable trees, such as the almond, the plum, the apricot, cherry, &c. The peach tree has a low and branching trunk, an irregular head of numerous brittle branches and twigs, oblong-lanceolate, serrulate leaves, solitary flowers, and a downy or smooth drupe, with tender, succulent, and highly flavored flesh. There seem to be no positive distinctions between the peach and nectarine, the presence or absence of down upon the fruit being apparently accidental. Numerous instances are known where the same tree has produced both fruits, and sometimes upon the same branch, and where likewise a fruit has been partly nectarine and the rest peach. There are two prominent characters distinguishing the sorts, which are however found equally in the nectarine, where the fruits are known as freestones and clingstones, the flesh parting readily from the stone or nut, or else adhering closely to it.—The peach tree considered as an ornamental shrub has several beautiful forms or varieties, viz.: the double-flowering, with large showy blossoms like small roses; the white-blossomed, very ornamental, with fruit of little value; the variegated-leaved; and the flat peach of China, with almost evergreen foliage and singularly shaped fruit, which can be treated as a pot plant with much facility. A curious variety with pendent branches and large white flowers, called the weeping peach, is of American origin.—The peach succeeds as a fruit tree wherever the winters are not severe enough to kill the young wood. In England it withstands the usual winter weather; it is a standard tree in Italy and the south of France. In the United States, where the winters are more severe, it still does well, owing to the higher temperature of the summers. Where the peach is not extensively grown in orchards, it is frequently planted between other fruit trees, and in apple orchards; peach trees thus planted thrive for a few years, gradually giving place to the growing and overshadowing apple trees by their natural decline. In gardens it is well to plant them on the borders or near the walls, and a sheltered situation near the dwelling house often proves advantageous. The peach is also raised in structures of glass, either heated artificially by flues or warmed by the sun. It forces well, the precaution being taken so to regulate the heat that a sufficient space of time shall be allowed for the perfect foliation, blossoming, and maturing of fruit. Sufficient moisture should be judiciously applied to the roots during the growth of the tree and previous to the ripening. Pruning is unnecessary in outdoor standard trees; but if practised, the new shoots should be shortened so as to allow 6 or 8 inches of strong wood. In artificial management the pruning should be carefully attended to. Frequently old trees of esteemed kinds become very irregular in their heads, by the tall and straggling branches; and it has been found to be a good plan to tie such branches loosely together by ropes to prevent the winds splitting them down when laden with fruit. The fruit buds are produced upon the young branches, and are round and plump; the leaf and shoot buds are oblong and pointed; therefore in pruning care must be taken to cut down to the pointed buds, rather than to the round and plump ones, so that a new leafy branch above the fruit can be secured. The finer varieties of the peach, and those thought to be tender, are sometimes trained against walls or on espaliers; but the great facility with which the peach ordinarily grows, and the abundant crops it produces almost without care, have made its cultivation a matter of little attention here, not even receiving so much as is bestowed upon other trees.—The fruit of the peach tree abounds in varieties, the London horticultural society's catalogue for 1842 giving a list of 28 distinct sorts, each of which has many synonymes. Downing reckons the number cultivated in Europe to be about 50, while in this country innumerable seedlings have been produced, and some of them of the highest excellence. The comparative want of sunshine and of heat in England causes the finest American sorts to fail there in point of flavor and worth. Among the best foreign sorts may be cited the Barrington, Bellegarde, chancellor, early Ann, George IV., Heath, Malta, noblesse, and royal George, which succeed under our cultivation; and the following superior sorts are of American origin: Crawford's early melacoton, Crawford's late melacoton, Cooledge's favorite, late red rareripe, lemon clingstone, Morris's red rareripe, Morris's white rareripe, Oldmixon freestone, president, and red rareripe (early). There are many others of perhaps equal worth, which are but little known beyond the localities where they originated.—The peach tree is very easily propagated. This may be done by the seeds of superior kinds, or from fruits which have been cross impregnated, and by budding the young seedlings of the first year's growth, toward the middle of September. This process is so successful that any other is seldom used. On planting out the peach tree, it is found advisable to severely head it down, as thereby the growth is made more vigorous and hardy. Close pruning is often found serviceable in the same way for established and standard trees. The plum tree is used for stocks with advantage, especially for trees intended for walls and espaliers, as thereby a dwarfer habit is obtained. The best soil for the peach is a rich sandy loam; next to this, a strong mellow loam; then a light, thin, sandy soil. The last has been considered the best, but it has been found that the tree does not last so long as in a richer soil.—The diseases incident to the peach tree are the yellows, the curl, and the gum. The origin of the first and most fatal disease is not clearly known, but it is supposed to indicate an original and organic taint, transmissible through the seed; such trees as possess it should be eradicated and their seeds not sown. The curl attacks the leaves, swelling and distorting them, and causing them to prematurely fall. This disease has been attributed to the cold of the spring, or to aphides, insects which nestle in the affected leaves; but as the same appears in conservatories and on trees grown in pots under glass, the first named conjecture cannot be true. It is more probably owing to the presence of myceloid threads of a minute fungus which, growing in the tissue of the leaf, produces a rapid and abnormal growth, and affords thereby a succulent pabulum to the aphides as well as a secure and warm retreat. The gum is owing to the depredation of the peach tree borer (*ageria exitiosa*, Say), a lepidopterous insect like a blue fly, which deposits its eggs under the bark; these, hatching into worms, devour the inner bark and cause the extravasation of the sap, which on exposure to the air is converted into gum. Destroying the insect is the only cure.—The value of the fruit of the peach tree in a commercial point of view in the United States is very great. Thousands of bushels of peaches are marketed from the peach orchards of the middle states yearly. In western New York and in other parts of the country, the fruit is dried by artificial heat, the stones being taken out previously, or even dried in the sun, and thus made a marketable article. A spirituous liquor called peach brandy is distilled from the ripe fruit, and hogs are fed from the refuse. The leaves of the peach tree, bruised in water and distilled, give peach water, much esteemed for flavoring articles in cookery; and when steeped in spirits they communicate to them the flavor of noyeau. The medicinal qualities of the peach tree may be considered as nutritious and refrigerant, the bark, blossoms, and skins of the seeds being poisonous. The almond (*A. communis*, Linn.) is considered by some botanists as only a species of the peach, the general appearance being very similar; but the sarcocarp is uneatable, being destitute of pulp, tough, and fibrous. The peculiar bitter principle resident in the seeds of the variety known as bitter almond and in the leaves of the peach is attributed to the presence of hydrocyanic acid.

PEACOCK, a gallinaceous bird of the pheasant family, and sub-family *pavoninæ*, which includes, according to Gray, the genera *pavo* (Linn.), *polyplectron* (Temm.), and *crossoptilon* (Hodgs.), all natives of India and its archipelago. In the genus *pavo* the bill is moderate, with the base of the culmen elevated, the apical half arched and vaulted, and the sides compressed; wings short and rounded, with 6th quill the longest; head plumed and crested, and orbital region naked; the tail composed of 18 feathers, long and rounded, but in the males concealed by the greatly lengthened coverts; tarsi long and strong, with large transverse scales in front, and armed with a conical spur; toes moderate, the anterior ones united at the base by a membrane. They are splendid birds, preferring in the wild state wooded districts and low jungles; they are sufficiently hardy to endure the severe cold of the mountains of northern India; they roost on high branches, and make the nest on the ground among thick shrubs; the male does not attain his perfect train until the 3d year. The wild birds are more brilliant than the domesticated; Griffith says of them: "We find in their incomparable robe all that glistens in the rainbow, and sparkles in the mine—the azure tints of heaven, and the emerald of the fields." They are about the size of a hen turkey; the flight is low and heavy; they are polygamous, and lay from 12 to 20 eggs, about the size of those of a goose, and raise only one brood in a year. Some are more or less variegated, and occasionally one is seen entirely white. The food consists of grain, seeds, fruits, and insects. The common peacock (*P. cristatus*, Linn.) is probably the most magnificent of birds; its form is elegant, its movements graceful, and its plumage resplendent with tints of green, golden, bronze, and blue; the long tail coverts, which the male can spread like a fan, are beautiful beyond description, with their metallic and iridescent hues, white shafts, velvet-black centre, and brilliant terminal eye spots; the head is surmounted with a very elegant tuft of feathers; every one must have seen its display in public or private parks. The female is brownish and sombre, and destitute of the train. The voice is harsh and disagreeable, resembling the syllables *paon*, which is the French name for the bird; it is very fond of being admired, and its vanity has been proverbial from early antiquity; it has been asserted that the principal use of its train is, by its sudden spreading, to bewilder and terrify its enemies; it has not this effect, however, upon the tiger, to which this bird falls a frequent victim. The peacock was brought to Palestine by the fleets of Solomon, and to Europe at a very early period; it is now dispersed in a domesticated state all over Europe and the United States. In ancient Rome their costliness made them favorite luxuries for the table, and a dish of peacocks' brains and tongues was regarded as a necessary part of an ostentatious feast; even in the middle ages they formed a standing dish in grand entertainments; the moderns think their flesh dry and tough, and keep them only as ornaments. In the domesticated state they agree well with turkeys, but not always with the other occupants of the poultry yard; it is necessary to protect them from the cold of our northern winters; in the wild state they have a propensity to roost on the branches of trees, and should therefore have an opportunity to perch, either on a tree, wall, or roof; barley is the most common food given to them, and to this may be added millet and other grains, and leguminous vegetables; the females are apt to neglect their eggs and young, hence the services of a hen turkey are generally required to raise the brood. The green peacock (*P. muticus*, Linn.), from Java, has the neck greenish and copper-colored, and a tuft of long thin feathers barbed from the base on the top of the head. Mr. Sclater ("Annals and Magazine of Natural History," Aug. 1860) makes a distinct species of the black-shouldered peacock of Latham, under the name of *P. nigripennis;* this bird has long been known in aviaries, but has been considered as a variety or hybrid of the other two; he regards it as intermediate in geographical position as well as in characters between the *P. cristatus* and *muticus.*—In the genus *polyplectron* the bill is slender, straight, half vaulted at the apex, and curved to the tip, with compressed sides, and covered with plumes at the base; the tail is lengthened, broad, and rounded, without the long coverts of the preceding genus; the tarsi armed in the males with 2 or 3 spurs, in the females tuberculate; toes long and slender, the anterior united at base, and the hind one elevated. There are about half a dozen species, all showy birds, found in mountainous districts of India. The iris peacock (*P. bicalcaratum*, Temm.) is about as large as a domestic fowl, mottled with ash-colored, white, and brown; wings and tail and their coverts with rows of gilded, bronzed, purple, and reddish spots, with bluish and green reflections. The Thibet peacock (*P. Tibetanum*, Temm.) is a rather larger bird, and differs principally from the last in the blackish lines of the plumage; the tail is reddish, each feather having a double ocellated green spot; it is a hardy bird, and a great favorite in the aviaries of the wealthy Chinese.—In the genus *crossoptilon* the bill is shorter than the head, broad at the base, with the lateral margins curved, the upper mandible spreading beyond the lower and overhanging it; tail lengthened and broad, rounded at the end, with the coverts slightly covering the base; tarsi strong, covered in front with divided scales, and armed with a spur; hind toe short and elevated; claws strong and curved; sides of the head covered with a papillose skin; the feathers loose and hair-like. The single species described (*C. auritum*, Hodgs.) is peculiar to the mountains of Thibet, and is very rare; the general color is white, with the primaries brown, the secondaries bluish cinereous, the feet and orbital region red, and the crown bluish black, of rigid feathers in vertical laminæ; an ear tuft of long, decomposed white plumes; the tail with bluish, green and purplish reflections, the lateral feathers with a subterminal oval white spot.

PEALE, Charles Wilson, an American painter, born in Chesterton, Md., April 16, 1741, died in Philadelphia in 1827. He was originally by trade a saddler, but at various times of his life followed the occupations of harness maker, watch and clock maker, silversmith, painter in oils, crayon, and miniature, modeller, preserver of animals, dentist, public lecturer, &c. Painting however was his chief employment, the others being incidental to it, or assumed for temporary purposes. He received instructions in art from a German painter named Hesselius, who had been a pupil of Sir Godfrey Kneller, and subsequently from Copley, then living in Boston. In 1770 he visited England, and for several years was a pupil of West. Returning to America, he established himself first in Annapolis and afterward in Philadelphia, and for many years was almost the only portrait painter deserving the name in North America, his reputation being such that people came to him from Canada and the West Indies to be painted. During the revolutionary war he commanded a company of volunteers, with whom he participated in the battles of Trenton and Germantown; and he also painted the portraits of many officers and distinguished men, which formed the nucleus of a national portrait gallery subsequently collected by him. He also served in the Pennsylvania legislature. About 1785 he commenced the formation of a museum of natural curiosities, the idea of which had been suggested to him by the sight of some fossil bones, brought to him to be copied. In a few years his collection of pictures and other objects was removed to a large building specially prepared for their reception, which, under the name of Peale's museum, was long one of the principal attractions of Philadelphia. Subsequently the entire skeleton of a mammoth was added to the collection, and in connection with his museum Mr. Peale lectured on natural history. He aided in founding the Pennsylvania academy of fine arts, to 17 annual exhibitions of which he was a contributor.—Rembrandt, 2d son of the preceding, born in Bucks co., Penn., Feb. 22, 1778, died in Philadelphia, Oct. 3, 1860. At the age of 8 he was a tolerable draughtsman. In 1796 he established himself in Charleston S. C., as a portrait painter, and between 1801 and 1804 he studied in London under West. Subsequently he passed several years in Paris, and executed portraits of eminent men for his father's museum. In 1809 he returned to Philadelphia, where during the next few years he painted many portraits, and also two pictures celebrated in their time, the "Roman Daughter" and the "Court of Death," the latter founded on a passage in Bishop Porteus's poem on death. This work, which was 24 feet in length by 13 in breadth, and contained 23 figures, was exhibited in the chief cities of the United States, and brought the author a large sum of money. Thenceforth until near the close of his long life, he devoted himself chiefly to portrait painting, numbering some of the most eminent men in the country among his sitters. The work in this department by which he was chiefly known was his portrait of Washington made from life studies. He published a book of European travels, and a small treatise on elementary drawing entitled "Graphics."

PEANUT, the seed of the *arachis hypogæa* (Linn.), an herbaceous plant belonging to the pulse family of the natural order *leguminosæ*. This order comprises the leguminous plants, a vast group, which, though differing in the structure of the flowers, yet unite in the common form of the seed vessel, which is that of a pod. The peanut has an annual root; a procumbent stem from 9 to 18 inches long, branching and pilose; leaves borne on petioles and consisting of 4 broad, blunt leaflets in pairs, subsessile, minutely mucronate at the apex, entire and bordered by a pilose nerve, the stipules adnate to the petiole. The flowers are papilionaceous, the barren ones yellow and small, and the fertile destitute of calyx, corolla, and stamens; the ovary after impregnation gradually elongates, and curving downward buries itself in the earth, where it matures into an oblong, terete pod, with thickened and reticulately veined indehiscent valves; this when mature is of a pale yellow color, often contracted in the middle, and contains 1 to 3 seeds of an irregularly ovoid shape, with thick cotyledons and a straight radicle. The seeds are full of oil, which when expressed is said to be in no way inferior to that of olives. The plant is tropical, and is largely cultivated in hot countries for food, as in the southern United States, in South America, and in Africa. The seeds are eaten both raw and roasted.

PEAR, an edible fruit, the produce of the *pyrus communis* (Linn.). In its wild state the pear tree has a pyramidal-shaped head, with thorny branches, at first erect and afterward becoming pendulous and curving downward; the leaves varying greatly in form, and downy or glabrous, narrow or broad; the fruit small, austere, and unfit to eat. The wild pear tree is a native of Europe from Sweden to the Mediterranean, and of Asia as far east as China and Japan. From the variety of the common pear designated as the *sativa* by De Candolle all the fine garden sorts of pears have originated. The pear tree belongs to the natural order of *pomaceæ*, being exogens with rose-like, many-petalled, regular flowers, and carpels adhering to the calyx by their backs. The distinctive characters of the pear tree properly so called are: leaves simple, without glands; flowers with the calyx urceolate, the limb 5-lobed, the petals 5-spreading, flat, and white; stamens indefinite, inserted in the throat of the calyx; styles mostly 5; fruit a fleshy pome, containing about 5 cartilaginous carpels; seeds 2 in each carpel; embryo erect with flat cotyledons. The cultivated pear tree has been known from very remote times, being mentioned by the earliest writers and familiar to Theophrastus and Virgil. Pliny describes numerous varieties known to him, and from his remarks it would appear that the earlier ripening kinds and the winter pears were then in existence. It is conjectured that the pear was introduced into England by the Romans; and some of the older sorts still in existence are mentioned by name in the account books of the exchequer in the time of Henry VIII., and by Gerarde, a celebrated herbalist, who published a catalogue of trees, &c., as early as 1596; while, according to Miller, who wrote in 1795, the number of cultivated varieties known was 250, from which he selects 70 or 80 as the best. Since that time the number has been constantly increasing from the efforts of the French, and especially of Van Mons of Belgium, while in England and America very fine and luscious sorts are annually springing into existence through the sowing of seeds and by hybridization. Through the efforts of gentlemen connected with the London horticultural society's garden, all the varieties that could be obtained were collected and classified; and in its catalogue published in 1842 no fewer than 442 kinds are specified, with their accompanying synonymes. In the United States the readers of the various horticultural magazines are familiar with the hosts of improved and valuable varieties which have since originated or been introduced to notice.—The cultivated pear tree thrives in any rich loamy soil, and manure judiciously applied proves very beneficial. Old trees which have ceased to bear good fruit have been renovated by digging around their roots and applying a compost of well rotted manures mixed with vegetable matters, soap suds, ashes, &c. The perfection of the fruit and the flavor of particular kinds depend very much upon the nature and quality of the soil; and particular varieties have been found to do perfectly well in situations which vary in some essential particular from others in their vicinity. The pear is cultivated in a variety of modes, being set out as a standard tree, when it is grafted upon some seedling stock and suffered to grow to great size; or used as a dwarf tree, by being grafted upon the quince root; or planted near walls and grown upon espaliers, when its training and pruning are still more constrained and artificial. The modes of training dwarf and wall trees are various, but on walls the 3 principal methods are the fan-shape, the pendulous, and the horizontal. The main object being, however, to distribute equally the vigor of the tree, it has been found that the last named mode is the best. This is done by cutting back a central shoot and training branches horizontally to the right and left. For market gardening and for farmers the standard trees are the best, many bushels of fruit being raised on single trees. For small gardens the dwarf trees are preferable, enabling many choice varieties to be grown near together and on a small area. Sometimes such trees are trained into artistical forms by tying the young and growing branches to stakes, or by bending them down toward the earth, securing them in such position by strings and pegs. In making a selection, the peculiarities of the different varieties, in reference to their stocks, soil, and crops, should be studied. Some will not grow in the open country, and require the shelter of the garden; some do best grafted on the pear, and others on the quince; and others require more than ordinary management. The great variety of climate in the United States enables the fruit grower to find congenial situations for every foreign sort, and accordingly treatises on pear culture assign certain sorts to certain sections. For the farm, standard trees of the following autumn and winter fruits have been recommended, viz.: Catillac, Chelmsford, black pear of Worcester, Spanish bon Chrétien, Uvesdale's St. Germain, and vicar of Winkfield. For a succession of early, autumn, and winter fruits in small gardens, among others the following foreign kinds may be named: Madeline, Williams's bon Chrétien, summer franc réal, white doyenné, fondante d'automne, Marie Louise, Urbaniste, Van Mons' Léon le Clerc, beurré Bosc, winter Nelis, and beurré d'Aremberg; and of American seedlings, the Bloodgood, Dearborn's seedling, Andrews's, Seckel, Dix, Columbia, &c.—The value of the pear is twofold, viz.: for the dessert, and for baking, stewing, and preserving. Dried pears are as well known in France and Belgium as dried apples are with us. Dessert pears embrace not only the summer kinds which ripen on the trees, but some of the winter kinds which are not fit for eating until toward the following spring. To ripen these it has been found convenient to construct fruit rooms in which the pears are laid separately on shelves and kept as nearly as possible at a uniform temperature. Another use of the pear is for making from its juice a liquid called perry, which is richer and more esteemed than cider. In some parts of England, France, and Germany there are particular varieties called perry pears. Several trees of such are mentioned by M. Bosc as being about 400 years old; and according to Loudon a very extraordinary tree in the parish of Holm-Lacey, Herefordshire, England, has yielded from its fruit 15 hogsheads of perry in a year. The best English perry pears are the Barland, Longland, Oldfield, and Teinton squash. The great age to which the pear tree may attain indicates somewhat the value of its wood as timber. It is heavy, strong, and compact, and can be used in making joiners' tools and in cabinet work; it also furnishes a good fuel and excellent charcoal.—The pear tree is subject to two principal diseases, which are very injurious to the cultivator, known as blights, but originating from very distinct causes. The young branches are sometimes attacked by a mischievous coleopterous insect, first described by Prof. Peck in the "Massachusetts Agricultural Repository," vol. iv. No. 3, as the *scolytus pyri*, which bores into the bark and wood, and cuts off the passage of the ascending sap; when this supply fails the branches suddenly perish. The other disease is the effect of late growth during the previous autumn and of imperfect ripening of the wood, in consequence of which it becomes frozen and the tissues killed and disabled from carrying on the vital functions; this is termed the sap blight or frozen sap blight. Varieties of the pear tree which mature their wood early are rarely affected in this way.—The true pear tree is not represented in the American flora, and its nearest species in the natural order *pomaceæ* is the American crab apple (*pyrus coronaria*, Linn.) of western New York, and the western and southern states.

PEARCE, Zachary, an English prelate and scholar, born in 1690, died in Little Ealing, June 29, 1774. He was the son of a Holborn distiller, and was educated at Ealing, at Westminster under Dr. Busby, and at Trinity college, Cambridge. While in college he is said to have written two numbers of the "Spectator" (572 and 633), and Nos. 114 and 121 of the "Guardian." In 1716 he published an edition of Cicero *De Oratore*, with notes and emendations, and dedicated it to Lord Chief Justice Parker, who caused him to receive various preferments. In 1724 his edition of "Longinus on the Sublime," with a new Latin version and notes, appeared. In 1739 he was made dean of Winchester, in 1748 bishop of Bangor, and in 1756 bishop of Rochester with the deanery of Westminster added, and later was offered the bishopric of London, which he refused. When 73 years old he wished to resign his offices, and for that purpose had an interview with the king; but in consequence of the disapproval of the episcopal bench, George III. refused him permission. Beside the works already mentioned, he published a "Review of the Text of Paradise Lost," in opposition to the emendations of Bentley; "An Account of Trinity College, Cambridge;" "The Miracles of Jesus Vindicated," in 4 parts (8vo., 1727-'8); beside a number of sermons, treatises, and discourses on various subjects. His greatest work was published after his death, under the title of "A Commentary, with Notes, on the Four Evangelists and the Acts of the

Apostles, together with a new Translation of St. Paul's Epistle to the Corinthians" (2 vols. 4to., 1777). A collection of "Sermons on Various Subjects," from the manuscripts of Bishop Pearce, appeared in 1778 (4 vols. 8vo.), with a dedication to George III. by Dr. Johnson.

PEARL, a round, tubercular, or irregular concretion, consisting chiefly of carbonate of lime, found in many bivalve shells, especially in the *avicula margaritifera*, or *meleagrina margaritifera* of De Lamarck, or the true pearl oyster, and among fresh water bivalves in the *unio margaritiferus*. (See MUSSEL.) In form they are usually spherical, and their color is yellowish or bluish white. The purest white pearls are most esteemed in Europe and America, and those of yellowish tinge by the Hindoos and Arabs. Their hardness somewhat exceeds that of calcareous spar, though when treated with acid they are found to possess the same composition with this mineral, with the addition of fine films of membrane or albuminous matter, which remains behind, retaining the form and structure of the pearl, and in nacreous pearls the iridescence also. They differ in structure according to the portion of the animal in which they are found. Those developed in the inner layer of the mantle and in the gills are often of small size and numerous, and are known as seed pearls. Others are formed around particles of sand or other foreign bodies introduced into the pallial cavity. These consist of concentric layers of wavy calcified membrane, but the external pearls from the outer layer of the mantle and attached to the shell consist of a concentric layer of minute vertical prisms. The Chinese have long been in the habit of causing the formation of pearls by introducing into the shells small beads of mother-of-pearl or other substances, which soon collect an incrustation of calcareous matter. It is supposed that the natural secretion of the substance of pearls is always owing to some injury the animal has received. Linnæus first called attention to this phenomenon, and was knighted for demonstrating the fact.—From a very early period pearls have ranked among gems, and been highly esteemed as ornaments. In the time of Job they were accounted of great value, and frequent allusions are made to them in the Scriptures. The Greeks and Romans used them in profusion, and even decorated their feet with pearls. Pliny, after referring to the prodigal display of pearls in his time, adds: "Nay, even more than this, they put them on their feet, and that not merely on the laces of their sandals, but they must needs tread upon them and walk with them under foot as well." He also alludes to the breastplate which Cæsar brought home and dedicated to Venus Genetrix, stating that it was formed of British pearls; which confirms the statement of Suetonius, that pearls were Cæsar's chief inducement for his British expedition. The two famous pearls of Cleopatra, which she proposed to dissolve in vinegar in honor of Antony at her luxurious repast, must have been of extraordinary size, as they were valued at 10,000,000 sesterces, or about $400,000. At the Paris exhibition of 1855 Napoleon III. exhibited an enormous pear-shaped pearl. The largest known in modern times belongs to O. A. J. Hope, Esq., of England. It weighs 3 oz., and is 4½ inches in circumference and 2 inches in length, but irregular and imperfect. The art of piercing and drilling them is well understood and skilfully executed by the Hindoo artisans. They drill a number of holes of varying sizes over the surface of a soft board, into which they insert the pearls, which are secured by dampening the board and so causing the pores to expand and the wood to tighten round the pearls until drilled, when the board is allowed to dry. A slight tap disengages them.—The pearl oyster, from which almost all the pearls of commerce are obtained, is a bivalve of nearly circular form, slightly convex, and sometimes as large as 12 inches in diameter. It is met with in different parts of the world, especially in the Indian ocean and the northern Pacific. Like the common oyster, pearl oysters congregate in large numbers on banks, and are obtained year after year from the same localities. Where the water is shallow, they are sometimes dredged, but they are generally taken by divers. The most famous pearl fisheries are near the coasts of Ceylon, Japan, Java, and Sumatra, and in the Persian gulf. The coast of Colombia and the bay of Panama were long since famous for their product of pearls, and they have furnished large amounts of them, but generally of inferior value to the oriental pearls. Still, one possessed by Philip II. of Spain, obtained in 1574 from Margarita, weighed 250 carats, and was valued at $160,000. The Spaniards who first visited the American continent found the natives decked with necklaces and bracelets of pearls, and Montezuma is described in his first interview with Cortes as wearing garments adorned with this precious ornament. In the trade in pearls from the Spanish American coast which soon sprung up, the islet of Cubagua became famous for the abundant supplies it furnished. On the W. coast of Central America pearls are still procured. They are of fine lustre, but of irregular forms. Small vessels from Mazatlan and Acapulco are employed in this business. Beside the crew, they carry Indian divers, called *buzos*, who receive for their services ½ of the profits, the remainder being equally divided between the government and the owner of the vessel. Humboldt remarks with surprise that he had never heard of pearls found in the fresh water shells of South America, though several species of the *unio* genus abound in the rivers of Peru. The accidental discovery at Paterson, N. J., in 1858, of some of unusual size, occasioned the New Jersey pearl excitement of that time, which was no doubt heightened by the largest having been found at the commencement of the search; it was a pearl of more than an inch in diameter, perfectly spherical and with fine orient; it was purchased by Messrs. Tiffany of New York, and disposed of through their establishment in Paris, where it is said to have become the property of the empress at a price exceeding $2,000.—Among the most famous pearl fisheries are those of Ceylon and Coromandel, which are now controlled by the English government, as formerly by the East India company. From the time of Pliny, when the Romans obtained their pearls from the same region, Ceylon has always been celebrated for its pearls and its pearl divers. At present the fisheries are annually surveyed and farmed out to the highest bidders, each portion being fished only once in 4 years, that the young oysters may have time to grow. The divers are natives trained to this pursuit, and accustomed to descend to depths of 6 or 8 fathoms 40 or 50 times a day. They take down a large stone to hasten their descent, and a bag in which they place the oysters, as they tear them off from the rocks. They remain under water a minute to a minute and a half, and come up with about 100 oysters. The occupation is very laborious, and the divers are unhealthy and short-lived from diseases of the heart and lungs and congestion of the brain during immersion; they also run great risks from the attacks of sharks and the large hook squids. The fishing season commences in March or April, and continues about a month. For a few months the bay of Condatchy, on the W. coast of the island, which is the most attractive point in this fishery, presents a most lively scene, in striking contrast with its usually quiet aspect. A motley crowd of people of various nations, with their strange diversities of dress, language, religion, and manners, is collected from all directions—Brahmins and Roman Catholics, Mohammedans and Jews, merchants and divers—all eager and excited in speculation and trade. Sometimes not fewer than 150,000 persons are thus assembled, living under the temporary shelter of light bamboo huts. At daybreak the boats start off at the firing of a gun, and at noon their return is signalled in the same manner. On landing, the freight is delivered to the owners, and some of the shells are immediately opened and the pearls extracted; others are piled in large heaps and left in the sun till the bodies of the animals putrefy, when they open of themselves and the pearls are removed. These are passed through a succession of sieves, and thus those of corresponding sizes are brought together. A single shell often contains from 8 to 12, and in some instances it is said even 20 pearls. The usual dimensions of good oriental pearls are from the size of a pea to about 3 times that size. Those smaller are called ounce pearls from being sold by weight, and the smallest seed pearls. To the latter are attributed important medicinal virtues by the natives of Japan and India. The pearl fisheries of the Bahrein islands in the Persian gulf are said to yield annually from $1,000,000 to $1,200,000.—Pearls are valued as well for the purity of their lustre as for their size. The smaller ones are worth from 50 cents to $3 each; single fine pearls are worth $5 and upward; and a handsome necklace of pearls as large as peas is worth from $500 to $15,000. Pearls in commerce are classed as oriental and occidental, or Indian and Pacific, and divided into round, pear-shape, and baroque; when smaller than $\frac{1}{12}$ of an inch in diameter, they are termed seed pearls. The Saxon, Scotch, Welsh, and Irish are from the same source as our New Jersey pearl, the fresh water mussel (*unio*). The beautiful pink-colored West Indian conch pearl, and our clam pearl, are not strictly pearls, being mere calcareous aggregations, seldom nacreous, and never concentric as the true pearl is.—Nacre or mother-of-pearl is the iridescent inner layer of the shell; it is excreted as a slimy matter on the interior, and becomes hard by the deposition of carbonate of lime; it forms generally the chief part of the shell, the rough exterior epidermis being thin and dark-colored. The iridescence seems to be due to the minute undulations of the concentric layers, from whose outcropping edges the rays of light are differently refracted, or to the small folds of a single lamina; it has been successfully imitated on steel. Mother-of-pearl is familiarly known in its application to ornamental purposes, and thousands of tons of the shells are annually exported from the Indian and Pacific oceans, valued according to quality from $70 to $650 a ton; it is used principally for buttons, knife handles, inlaying of furniture, &c., and is often beautifully carved. The nacre of the genera *avicula*, *turbo*, *haliotis*, *nautilus*, and other bivalve and univalve shells, is also used as mother-of-pearl.—False or artificial pearls were formerly made at Murano, a suburb of Venice, of glass lined with a pearl-colored varnish, or with quicksilver; but the French have been of late years the most successful imitators of the natural pearl, and to such a degree of perfection have they carried the art, that only the most careful examination discloses the difference between the true and the false gem. The artificial pearls are lined with wax and fish scales, which are taken from the body of the fish while living, in order to preserve the glistening hue. The roach and dace, which furnish the scales, are supplied by the fishermen of the Seine, who derive a very considerable profit from this source. A variety of the smelt, said to be peculiar to the Tiber, has long afforded the Roman jewellers the means of coating waxen beads so that they have a greater resemblance to the real pearl than either the Venetian or French; but being external, it is much less durable. The exact process is kept jealously secret.

PEARLASH. See POTASH.

PEASANTS' WAR, a revolutionary movement in southern and central Germany, which accompanied the reformation of Luther. The peasants' war has frequently been represented as one of the effects of the religious reformation, while in fact it was merely its corollary, springing from the same cause, which, in working upon different conditions of society, produced different results. Thus, while the reformation was principally a movement of the middle classes, as they are now termed, the peasants' wars were the uprising of the lowest strata of society. Through the reformation the *bourgeoisie*, if that modern term may be allowed, strove for mastery over the nobility; while in the peasants' wars broad, universal democracy, however crude in its forms, made unsuccessful efforts to bring down the lofty and complicated structure of a social system based upon privileges and distinctions of classes. As the reformation was preceded in the 14th and 15th centuries by many unsuccessful attempts, so was the great peasants' war by isolated insurrections. In 1476 Hans Böheim, called "Johnny the Piper," proclaimed himself a prophet, and rallied the peasants of Franconia against the rule of the bishops of Würzburg. In 1492 the *Käsebrüder* (cheese boys) in the Netherlands succeeded so far as to take and hold for some time the cities of Alkmaar and Hoorn. In the following year a rising of the Alsatian peasantry against the despotism of the burghers was suppressed with the utmost cruelty. In 1502 the peasants of Swabia formed a league, known under the name of the league of the brogue (*Bundschuh*), which was promptly put down by the nobility. Another effort was made by the peasants' league of the "poor Conrad," but it proved equally unsuccessful. In 1515 the peasants of Hungary, having been called to arms against the Turks, were formed into an army by George Dózsa and levied a war of extermination against the nobility. They maintained their rule for a year, when they were vanquished by John Zápolya. Yet of all these movements no one was so well preconcerted and organized, or so well defined in its objects, as the peasants' war which ravaged a large part of Germany in 1524 and 1525. It broke out in Swabia, where the peasants, having conquered the abbey of Kempten, compelled the prince abbot to resign by treaty all rights and privileges oppressive to the peasantry. Next Diederick Hurlewagen led the peasants of the Allgau against the prince bishop of Augsburg, and within a few weeks tens of thousands of peasants rallied under the emblem of a plough wheel. Obtaining the secret support of the expelled Duke Ulrich of Würtemberg, they soon became masters of the country, and many noblemen fell victims to their hatred; no quarter was given or asked. Hundreds of castles and convents were sacked and burned. The people of the small cities and towns made common cause with the peasants; a number of noblemen even took sides with them and gave them a more perfect military organization. Wherever the news of these successes went, insurrections broke out. In Franconia over 200 castles and convents were destroyed. Thence the war extended to Bavaria, Austria, Hungary, Croatia, and Bohemia in the east, through Hesse, the Palatinate, Alsatia, and Lorraine in the west, and even to Thuringia and Saxony, where in Thomas Münzer the peasants found an enthusiastic and gifted leader. The Swabian peasants, with whom the movement had begun, proclaimed the following propositions, the attainment of which was to be the common object of the revolution: 1, the ministers should be elected by the lay members of the church; 2, the proceeds of the tithing should be applied to the support of the poor and to municipal purposes, a reasonable salary only being appropriated therefrom to the minister; 3, servitude should be abolished; 4, the exclusive privileges of princes and noblemen in regard to hunting and fishing should be abolished; 5, the woodlands appropriated by the clergy and nobility should be returned to the village corporations; 6 to 8, the socage service should be fixed by law, the ground rent reduced, and the feudal tenure regulated; 9, justice should be administered fairly and firmly according to plain written laws; 10, all fields and pasture grounds arbitrarily taken from the village corporations by the clergy and nobility should be returned to them; 11, the right of heriot shall be abolished; 12, any of the preceding articles should be null and void whenever it should be proven not to be in accordance with the Scripture. In two columns, one led by Götz von Berlichingen, the other by Florian Geyer, the peasant army marched toward Würzburg, whose citizens made common cause with them. But instead of vigorously pushing to the north and uniting his forces with those of Münzer, Götz von Berlichingen, who at heart was a traitor to the cause, which he had espoused from mercenary motives, remained inactive and gave the princes time to concentrate their armies. In April, 1525, Count Waldburg led the army of the Swabian league through Würtemberg, and defeated all detached corps of the peasants. On May 2 a column of 25,000 peasants was routed after a bloody struggle near Böblingen. When, on May 15, Münzer's army had been annihilated near Frankenhausen, and at the same time the peasants of Lorraine had been crushed in two sanguinary battles near Scherweiler and Lupstein, the war was virtually at an end. A horrid butchery followed. In the Palatinate 17,000 peasants capitulated. The duke of Lorraine pledged his princely word not to molest them on their return; yet they had scarcely laid down their arms when the soldiery was let loose upon them, and they were massacred almost to a man. The noblemen and burghers who had taken sides with them while their success seemed probable, left them as soon as the tide turned, and even joined their enemies. The Allgau peasants alone withstood the power of the Swabian league for some time longer. At last they succumbed to the greatest general of the time, George von Frundsberg. The vanquished were treated with enormous cruelty. Thousands upon thousands of prisoners were beheaded, hanged, impaled, or tortured to death. Hundreds of the inhabitants of those cities which had surrendered to the peasants shared the same fate. In Rothenburg, Weinsberg, and Würzburg especially, nearly all the prominent citizens were hanged. It is estimated that during the brief duration of the war no fewer than 100,000 or 150,000 people lost their lives. The propositions of the peasants were as violently denounced by the leaders of the reformation as ever the tenets of the communists have been by the liberals of the present day. The immediate effect of the peasants' war, like that of all unsuccessful revolutions, was a tenfold increase of the abuses against which it had been waged.—See Zimmermann, *Allgemeine Geschichte des grossen Bauernkriegs* (2 vols., Stuttgart, 1841; 3 vols., 1856).

PEAT, the spongy mass of vegetable matter composing the soil of swamps. It consists of matted roots, leaves, and stems of plants, the forms of which are sometimes distinctly preserved, and at others are lost in the mucky substance produced by their decomposition. It forms layers several feet in thickness, and in some localities repetitions of these are found at different depths, alternating with others of sand. The manner of formation of peat beds, the gradual spreading of the sphagnous growth of which they are made up, from the moist situations in which it originates, over surfaces naturally dry, and the conversion of these into swampy grounds, together with other peculiarities of these deposits, have been described in the article Bog. Reference is there also made to the immense bodies of peat in Ireland, where the material is most highly valued as a fuel. Peat also abounds in Scotland and upon the continent along the coasts of the German ocean, the waters of which by their overflow have determined its production. Its range is chiefly limited to the temperate zones, and to localities where the climate is moist, and the subsoil is impervious to water. In the southern hemisphere Darwin states that 45° marks its nearest approach to the equator. In the United States it is little known south of the state of New York; but it is met with in bogs of considerable extent in the N. part of that state, in New England, and in Canada. In the article Fuel (vol. vii. p. 781), the properties of peat for this use are briefly noticed; and it is there observed that its composition and valuable qualities are greatly affected by the variable quantities of mineral matters which it contains. This is rarely as low as 1 per cent. of the dried material, and in peat used for fuel sometimes reaches 33 per cent., and even more. The ashes consequently are often bulky, and according to their proportion indicate to some extent the relative values of different samples of peat. From the numerous analyses that have been made of them, they are found to present a general similarity of composition, the most variable ingredients being the sand of accidental mixture. Beside this they consist chiefly of silicate, sulphate, and carbonate of lime, and sulphate of iron. With these are phosphates and hydrochlorates of the same bases, and also of potash, soda, magnesia, and alumina. The ash being deducted, the carbon generally ranges from 50 to 60 per cent. of air-dried peat, as seen in the analyses presented in the article Fuel. According to Mr. W. Longmaid, the best samples contain from 70 to 75 per cent. of carbon. The more earthy varieties of peat, though poorly adapted for fuel, are often valued as manures for the sake of the phosphates and other fertilizing salts they contain; they are most advantageously employed in the preparation of composts with animal manures, and sometimes for tempering sandy or clayey soils. Other important uses of the material will be noticed after describing its varieties and manner of preparation for use.—Two sorts of peat are recognized; one in which the forms of the roots, stems, and leaves are distinctly preserved; and the other in which they are in great part or entirely lost by decomposition, and the result is a dense, fine-grained substance, of shining lustre like pitch. The former is of recent growth, constituting the upper layers of the bog, and is a spongy, elastic, and tough material, unless by drainage of the bog it becomes brittle. Its color varies from light to blackish brown, according to the extent of its decomposition. Both contain a large amount of water, which escapes as the peat is dried, leaving behind, it may be, only ¼ or ⅛ of the original weight. Both sorts are combustible, but the older peat is preferred, as by its greater density it gives out for the same bulk a greater amount of heat. Even this is rarely so heavy as the same bulk of water, only one of 27 samples examined by Sir Robert Kane and Dr. W. K. Sullivan, and described in their report in 1851, having a greater specific gravity than 1. This was an exceedingly dense peat, of conchoidal earthy fracture, from Athlone bog in Ireland. The vegetable structure was almost entirely lost, and when apparent indicated remains of *carex*, grasses, and *erica* in abundance; its density was 1.058. Another sample, of density 0.984, said to be a valuable fuel, found in Riversdale bog near Kimegad, is described as an extremely hard and compact peat with no trace of vegetable structure, and when broken exhibiting a resinous conchoidal fracture. The lightest varieties, of specific gravities 0.28, 0.323, &c., were spongy masses of almost unaltered *sphagnum* and *hypnum*, with remains of various grasses, twigs, bark, and roots. The dense compact peat appears to represent the first step in the progressive changes from vegetable substances to mineral coal.—The method of gathering peat, as practised in Europe, is first to remove the surface layer, which contains the living plants and their roots, extending to the depth of 6 inches to one foot. With a spade constructed to cut either 2 or 4 sides of a parallelogram, the material is then divided into oblong blocks, which, being raised up to the surface and spread for a while exposed to the sun and air, are afterward piled in open stacks and are thus more effectually dried. However well dried in this manner, the peat still retains from 20 to 30 per cent. of moisture. If the peat is of mucky consistence, so as not to bear handling when dried, the practice is to shovel it out from its bed, and moistening it with water cause it to be thoroughly intermixed and brought to uniform texture by the trampling of men and beasts. Being spread out in an even bed, it is marked off in rectangular shapes; and when the water has drained away from it, the blocks are cut out with a long knife and then are dried in the manner already described. When the peat is very thin and wet, it is gathered up by means of dredges, ladles, and even with instruments like a fisherman's net, formed of an iron hoop with one sharp edge, and having suspended from the other a bag of strong cloth through which water can drain. The material thus collected is kneaded in a kind of trough till it appears like mortar. This is laid upon a level flooring of hay in large cribs or troughs of 12 to 30 feet in width, the sides of which prevent its flowing away. When sufficiently drained it is trodden by women and children, who wear upon their feet flat boards 6 inches wide and 12 to 14 long. It thus becomes more solid; and when it will bear a person's weight it is well beaten with paddles, and then divided by lines into squares of 4 or 5 inches. On these lines the peat is cut into rectangular blocks, the length of which is the depth of the layer, about 8 inches. It is important that these should be pretty well dried before they are stored away, for fermentation is liable to take place in large close stacks of the moist material, and generate sufficient heat to set them on fire.—Much attention has been directed in Europe of late years to the uses to which peat is applicable, and various processes have been patented by which its value as a fuel is increased, or by which it is made to furnish a number of useful products. To render it more efficient as a fuel, it has been powerfully compressed by hydraulic machines, the blocks of peat being interlaid with matting. Its volume is thus reduced about ⅔, and its weight ⅔. The water that is expelled carries with it a portion of soluble mineral matter, that would be left behind if the water were evaporated; and thus the quantity of ash is diminished. By another process drying is effected by placing the peat in a centrifugal machine. After this it is ground to powder, and then thoroughly dried in cylinders which revolve in a heated chamber. From these, while at a temperature of about 180°, at which the tarry properties of the peat are just enough developed to cause it to cake under pressure, the powder is passed under the press, and is immediately converted into blocks, the density of which is about 1.14. Dr. Letheby reports of this fuel that it stows 71.24 lbs. to the cubic foot, while Newcastle coal stows about 49.69 lbs. It contains 9 per cent. of hygroscopic moisture, 55 of volatile matter, and 36 of charcoal, including 3.8 of ash. Being distilled in an iron retort, and the volatile products being passed through a red-hot iron tube in order to convert the paraffine and ingredients of the tar into gaseous hydrocarbons, 100 parts of peat yielded, of porous charcoal or peat coke, 36 parts; ammoniacal liquor, 18.88; thick tar containing paraffine, 5.14; and illuminating gas, 40. The illuminating power of the gas was equal only to that of 7 candles, but the quantity obtained was at the rate of about 14,000 feet per ton, which is as much as is afforded by the best Boghead cannel coal. When purified by passing it through an alkaline mixture, it was found free from sulphur, and in this respect preferable to coal gas. The qualities of the fuel are highly extolled; and one of these being its freedom from sulphur, it is well adapted for the reduction of ores, in the treatment of which the presence of this element is highly objectionable. The patentees (Messrs. Gwynne and co.) propose to apply it to this use by mixing the pulverized materials—ores, fuel, and flux—and compressing the mixture into globular masses, with which the furnace shall be charged.—The use of peat as a fuel in various metallurgic operations, as practised in Europe, is noticed in the articles CHARCOAL and FUEL, and in the former the methods of charring it are described. The calorific power of good dry peat, compared with coke of good bituminous coal, is estimated by Mallet to be as 1 to 7.61, and as equal to the conversion of its own weight of water into steam of 212° from 60°. By destructive distillation peat affords a variety of useful products, as pyroligneous acid or crude acetic acid, ammonia, volatile and heavy oils from which paraffine may be obtained, wood naphtha, inflammable gases, charcoal, tar, &c. Peat, more than other combustible bodies, favors the production of these organic compounds on account of the large amount of water in its composition, which keeps the temperature low during the distillation. The inflammable gaseous bodies may be advantageously employed to produce by their combustion the heat required for continuing the distilling operation, or for the evaporating pans or boilers. In 1849 a patent was granted for this process to Mr. Reece, and extensive works were afterward established by the Irish peat company near Athy, in Kildare, Ireland, for carrying it on. The peat is distilled in furnaces, like the ordinary blast furnaces, 32 feet 7 inches high, made perfectly tight by being encased in boiler-plate iron, and covered at top with a close conical valve and a double hopper. Air is blown in in limited quantity through three tuyères at the base. The volatile products are taken off at the top by two 12-inch pipes and conveyed into a hydraulic main 3 feet in diameter, from which the tar and other liquids flow into a tank, and the gases and vapors through series of condensing and purifying pipes and other apparatus, in which their separation is effectually completed. The charcoal is entirely consumed in the furnace. Various experiments of different chemists gave great encouragement to the company. The results of some of these trials are presented in the following table, those of Sir Robert Kane and Professor Sullivan having been arrived at by the distillation of samples of peat from different localities in Ireland, both in retorts and by combustion of a portion of the material by a blast of air, as the operation was then proposed to be conducted in the large way. There was little difference observed in the results of these two methods.

PRODUCTS OBTAINED BY THE DISTILLATION OF PEAT.

Products.	Kane and Sullivan.		Dr. Hodges.		Statement in company's prospectus.	
	per ton.	per cent.	per ton.	per cent.	per ton.	per cent.
Sulphate of ammonia	24 3/10 lbs.	1.110	22¼ lbs.	1.000	22 3/5 lbs.	1.000
Acetic acid, real hydrated	4 2/3 "	0.207	7½ "	0.828	....	...
Or as acetate of lime	6 4/5 "	0.805	....	....	nearly 15 7/10	0.700
Wood naphtha	50 1/5 oz.	0.140	63¼ oz.	0.282	66.3 oz.	0.185
Tar	58 3/4 lbs.	2.890	99⅓ lbs.	4.440	....	....
Products of the tar:						
Paraffine	2 4/5 "	0 125	....	....	8 lbs.	0.104
Oils	nearly 2 2/3 galls.	0.159	....	....	2¼ galls.	0.071

The manufactory is stated by Dr. Muspratt to have "now established itself, although it had many difficulties to contend against." The following late communication from Dr. Sullivan, however, does not give a very favorable view of the operation: "Now that a ready market exists, I have no doubt that 8 lbs. of paraffine per ton of good dry peat could be separated, especially by keeping over the summer oils until winter; in cold winters perhaps even more. Gas enough can be produced to work the factory (heating stills, &c.), but it has now been satisfactorily determined that the larger the supply of gas, the less will be the yield of tar, and *vice versa*. The yield of tar, when the temperature has been carefully attended to, has fully reached the anticipated quantity; but neither the ammonia nor the wood spirit has. The real source of profit, therefore, is the tar. Tar about 3.5 per cent., paraffine 0.13 per cent." From these conclusions it would appear that the chief value of peat is likely to depend on its employment as fuel; and as it is abundant in the northern parts of the United States, and but little esteemed, the experience of other nations with whom it is largely used merits attention. Moulded peat in small bricks, that sink in water, is supplied to Paris from several sources. It is brought from near Liancourt, a distance of 17 leagues, and sold at the rate of 20 francs for 2,204 lbs. avoirdupois. In 1855 one firm converted from 10,000 to 12,000 tons into charcoal, obtaining from 40 to 42 per cent. This sold at wholesale for 100 francs the 1,000 kilogrammes (2,204 lbs.), which was about the same value as wood charcoal. Mineral coal and wood at the same time were worth about ½ as much for the same weight In the exhibition of Paris in 1855 specimens of peat and peat charcoal prepared by different patented processes were exhibited, that were remarkable for their homogeneousness, density, and cheapness, and attracted particular attention. They were said to be economically employed for stationary steam engines, and even for locomotives.

PECAN, the name of a species of *carya*, a North American genus of trees belonging to the natural order *juglandaceæ*, representing the walnut family, and embracing many other species which produce edible and delicious-flavored nuts. (See HICKORY.) The pecan (*C. olivæformis*, Nuttall) is a slender tree with a regular trunk 60 or 70 feet high, the pinnate leaves 12 to 18 inches in length, the petioles angular; the leaflets are sessile, from 13 to 15 in number, oblong-lanceolate, acuminate, serrate, under side pubescent, terminal leaflet subpetiolate, attenuated at the base. It bears annually an abundance of sweet and flavored nuts, their husks being thin, and their shells soft and easily broken, and of a yellowish brown or ashen brown color. Michaux considers them superior in point of flavor to any of the nuts of Europe, especially in some particular varieties. The pecan grows spontaneously on river banks from Illinois southward to Mississippi. In gardens and in sheltered situations it bears the winters as far northward as the banks of the Hudson river in New York. It was introduced into France many years since.

PECCARY, a pachydermatous mammal of the hog family, and genus *dicotyles* (Cuv.), peculiar to America. In this genus the incisors are $\frac{4}{6}$; the canines $\frac{1-1}{1-1}$, not projecting beyond the lips as in the wild boar, but very much as in other mammals, small, triangular, and very sharp, the upper ones directed straight downward; the molars $\frac{6-6}{6-6}$, tuberculate; the fore feet are 4-toed, and the hind ones 3-toed, the outer accessory hoof being wanting; a mere tubercle in place of a tail; according to Cuvier, the metacarpals and metatarsals of the 2 longest toes on all the feet are united as in ruminants, but this Van der Hoeven says is far from being always the case. On the back, a few inches from the tail, in both sexes, concealed partly by the hair, is a gland which secretes a very fetid fluid; this bears a rude resemblance to a navel, and the generic name was derived from it, from δις, double, and κοτυλη, cavity. The head is broad, pointed, and rather large in proportion to the body; the ears moderate and pointed, the eyes small, the snout blunt, the legs thin and slender, and the skin covered with close, very stiff and sharp bristles. The collared peccary or Mexican hog (*D. torquatus*, F. Cuv.) is about 3½ feet in the male from snout to root of tail, the female being a little smaller; it is shorter but more compact than the domesticated hog; the hair is ringed with black and white, rather long, lightest at the tip; from each shoulder runs a more or less distinct white collar on each side of the neck. They usually go in couples or in small parties of 8 or 10, and not so often in large flocks as the next species; they prefer woods and swampy grounds, but they wander wherever food is abundant, even into the fields and enclosures of the planter, where they often commit great havoc; when attacked by wild beasts or by man, a flock will form a circle, with the young in the centre, and repel even the jaguar with their sharp teeth, in this way often killing dogs and severely wounding the hunter. The food consists of nuts, fruits, seeds, grain, roots, and whatever living thing they can find on or under the ground; they are omnivorous, though less carnivorous than the domestic hog; the flesh is white and tender, more like that of the hare than the hog, and with very little fat; when the animal is killed, it is necessary at once to cut out the dorsal gland, else the whole flesh would be tainted by its secretion and rendered unfit for food. They live in holes in trees or in the ground, or in any cavity which affords shelter; they are often very bold, attacking the traveller without provocation, and compelling him to ascend a tree for safety; a dog unaccustomed to hunting them is at once surrounded and killed. This species is found in Mexico and Texas, in the United States as far as the Red river in Arkansas, in lat. 31°, probably as far west as California, and in South America as far as Paraguay in lat. 27° S. When taken young they are easily domesticated, but do not mix or breed with the common hog; they bring forth only once a year, and one or two at a birth; they are rather sensitive to cold, and easily irritated, and manifest pleasure by a hog-like grunt. The white-lipped peccary (*D. labiatus*, Cuv.) is of a general blackish color, with the lower jaw white; it is a larger animal than the last, living in solitary forests in large troops, and is hunted by the natives for its flesh; it is found in South America, but does not associate with the other species. Travellers speak of a variety or perhaps a distinct species in Honduras, of a dirty black color with long tangled hair, going in large flocks and very ferocious when attacked; this goes by the name of warree.

PECK, a dry measure equal to ¼ bushel, or 2 gallons. Being dependent on the bushel, its exact capacity may be learned by referring to that title.

PECK, GEORGE, D.D., an American clergyman and author, born Aug. 9, 1797. He became a member of the Methodist Episcopal church in 1812, and entered the ministry in 1816. He was principal of the Oneida conference seminary from 1835 to 1839. He has been a member of 9 successive general conferences, and represented 4 annual conferences in that body. In 1840 he was appointed editor of the "Quarterly Review" and of the books of the general catalogue of the Methodist book concern, and in 1848 editor of the "Christian Advocate and Journal," which post he held until 1852, when he entered the regular work of the ministry. Dr. Peck has written "An Examination of Universalism," "The Lives of the Apostles and Evangelists," "Christian Perfection," "Rule of Faith," "Reply to Dr. Bascom on Slavery," "Wyoming, its History and Incidents," "Manly Character, Lectures to Young Men," and "Early Methodism in the Genesee Conference."

PECK, JOHN MASON, D.D., an American clergyman, born in Litchfield, Conn., Oct. 31, 1789, died at Rockspring, Ill., March 15, 1858. He received a limited education, and engaged in teaching for several winters, while he labored upon a farm in summer. In 1811 he removed to Greene co., N. Y., where not long after he united with the Baptist church. He was licensed to preach in 1812, was ordained at Catskill, N. Y., in 1813, and in 1814 became pastor of the Baptist church in Amenia, Dutchess co., N. Y. In 1816 he resigned his pastoral charge, and went to Philadelphia to study under the Rev. Dr. Staughton. In May, 1817, he was set apart as a missionary of the Baptist general convention to the West, went to St. Louis, and for the next 9 years was an itinerant missionary in Missouri and Illinois. In 1826 he visited New England and New York, soliciting aid to sustain missionaries in the West, and to assist in founding a literary and theological seminary at Rockspring. These objects were secured, and the Rockspring seminary edifice was erected on lands given by Mr. Peck. In April, 1829, he started "The Pioneer," the first Baptist journal published in the West, which he maintained for 10 or 12 years, at an annual loss to himself. In 1830 and 1831 he had charge of the seminary as principal. In 1831, in connection with the Rev. Dr. Going, he originated the American Baptist home mission society. In 1832 he published "The Emigrant's Guide," which led to extensive emigration to Illinois and other north-western states. Soon afterward he commenced the publication of a monthly Sunday school paper, with a view to promote the organization of Sunday schools in the West. In 1834 he published a "Gazetteer of Illinois." In 1835 Shurtleff college was founded by his exertions at Upper Alton, Ill., and the Rockspring seminary transferred to the new institution. Mr. Peck during the year travelled 6,000 miles, and raised $20,000 for the endowment of the college. His next effort was for the organization and endowment of a theological seminary at Covington, Ky. In 1840-'5 he took up his residence in Philadelphia as corresponding secretary and general agent of the American Baptist publication society, and having placed the society on a substantial basis returned to the West, and for the next 13 years was a pastor in various churches of Missouri, Illinois, and Kentucky, at the same time contributing largely to reviews and periodicals. During this period he wrote a life of Daniel Boone for Sparks's "American Biography," and a memoir of Father Clark, a western preacher, edited the "Annals of the West," and aided in the organization of historical societies in most of the north-western states and territories. He left a very large collection of manuscripts, mainly historical in their character. Harvard university conferred upon him the degree of D.D. in 1852.

PECTIC ACID. See Jelly.

PEDDLER, Pedler, or Pedlar, a word of uncertain origin, but probably derived in some way from Lat. *pes*, a foot, and perhaps through the French word *pied*. A peddler may be defined in law as one who travels about the country carrying with him goods for sale, usually by retail. Formerly, and in some countries at this time, a large part of the internal commerce in things of domestic use was carried on in this way. Peddling is now superseded, to a great extent, by permanent stores or shops, to which buyers come. This is the natural effect of the increase in the number of towns, or marts of trade, and of the greater facility of access to them by the improved roads of modern times. It still exists, however, and in thinly settled parts of this country may be said to flourish. In many, if not in all the states, peddling is regulated by statutory provisions, which are sometimes very stringent. They are intended to guard buyers from fraud, and also to protect the interests of regular traders. From the probable derivation of the word, it might be inferred that peddlers travelled on foot. In the United States this is not usually the case at present, as they commonly carry their commodities in a cart or wagon, which is sometimes a large one. In many of the states they are obliged to take out and pay for a license to carry on their trade.

PEDEE, Great, a river of South Carolina, which, rising in the N. W. of North Carolina, at the base of the Blue ridge, is called the Yadkin until it enters the former state near its N. E. corner. Thence it flows in a nearly S. direction, falling into Winyaw bay at Georgetown. Among its tributaries in South Carolina are Lynch's creek, and the Little Pedee, Black, and Waccamaw rivers. It is navigable for small vessels to Cheraw, about 150 m.

PEDOMETER. See Odometer.

PEDRO I. de Alcantara of Brazil, and IV. of Portugal, born in the palace of Queluz, near Lisbon, Oct. 12, 1798, died there, Sept. 24, 1834. On the invasion of Portugal by the French in 1807, the royal family fled to Brazil, which was raised to the rank of a kingdom in 1815. After the death of the queen Dona Maria I. the father of Dom Pedro became king of Portugal under the title of John VI., and in 1821 returned to that country, leaving his son as regent of Brazil. The arbitrary acts of the Portuguese cortes, which adopted measures reducing Brazil again to the rank of a colony, and commanding, among other things, the prince regent to come to Europe for his education, aroused the indignation of the inhabitants. A revolution took place, and Dom Pedro, placing himself at the head of the movement, was proclaimed protector and perpetual defender of Brazil; and the country being declared independent in Oct. 1822, he was proclaimed constitutional emperor, and on Dec. 1 was crowned. The difficulties to be encountered were, however, of the most serious character. No sooner had the resistance of the Portuguese troops been put down than rebellion broke out in the northern provinces, and at the same time the emperor was involved in a quarrel with the constituent assembly, wherein the democratic element was predominant. In 1825 Portugal recognized the independence of Brazil, and a treaty was made on terms highly unsatisfactory to the Portuguese. In 1826, the sovereignty of the province Cisplatina (Banda Oriental) being disputed between Brazil and Buenos Ayres, Dom Pedro declared war against the latter, which terminated unfavorably to his interests. His father dying in 1826, he became king of Portugal, but immediately abdicated in favor of his infant daughter, Dona Maria da Gloria, as the Brazilians feared that they were once more to be made dependent upon the mother country. The internal discontents increased; the feeling in the chamber of deputies against the emperor became of the most violent character; and at length a popular tumult in Rio Janeiro compelled him to abdicate in favor of his son, April 7, 1831, and to return to his native country. In the mean time the crown of Portugal had been usurped by his brother Dom Miguel, and Dona Maria, after a residence in England, had taken refuge in Brazil, whence she now accompanied her father to Europe with the hope of conquering her throne by his assistance. Dom Pedro landed at the island of Terceira, one of the Azores, issued a decree in favor of Dona Maria, and with the assistance of French and English volunteers began a war which terminated in 1834 by the complete success of the queen's party. (See Miguel.) On May 26 a convention was signed by which Dom Miguel agreed to leave the kingdom for ever. Dom Pedro was now appointed regent during his daughter's minority, but he died before it expired. In 1833 he had been excommunicated by the pope for confiscating monastic property in Portugal.

PEDRO II. de Alcantara, emperor of Brazil, son of the preceding, born Dec. 2, 1825. He was little more than 5 years old when his father abdicated the crown in his favor. During his minority the country was distracted by rival factions; and at length, when Pedro II. was 14 years of age, a bill was passed in the legislature declaring that he had attained his majority. On July 23, 1840, he ascended the throne, and was crowned July 18, 1841. The disturbed state of the country still continued. Several of the provinces were in arms; in that of São Paulo order was restored by Gen. Caxias; but the war was prolonged in the province of Minas Geraes until the decisive victory of the royalists at San Lucia in 1842. The subsequent reign of the emperor has been peaceful, with the exception of the war carried on against Buenos Ayres, for the independence of Uruguay and Paraguay. The troops of Brazil, Entre Rios, Corrientes, and Uruguay, under Urquiza, defeated those of Buenos Ayres under Rosas on the field of Monte Caseros. A dispute with Great Britain on account of the non-observance of the treaty regulations in regard to the abolition of the slave trade was satisfactorily settled by the prohibition of the traffic. Under his rule Brazil is steadily increasing in power, the government has been consolidated, the finances are in a good condition, and internal improvements are actively carried on. Dom Pedro possesses remarkable literary and scientific acquirements and a liberal turn of mind, and enjoys the enthusiastic affection of his subjects. On Sept. 4, 1843, he married the princess Theresa Christina Maria, daughter of Francis I., king of the Two Sicilies. He has two children, the princesses Isabella and Leopoldina.

PEDRO V., king of Portugal, born in Lisbon, Sept. 16, 1837. He is the son of Dona Maria II. and Prince Ferdinand of Saxe-Coburg, and his mother dying in Nov. 1853, he succeeded to the throne under the regency of his father. He visited England in the same year, and France at the time of the great exhibition in Paris in 1855, and also travelled in Italy, Switzerland, Holland, and Belgium. During his minority the most important transactions were the conclusion of extradition treaties with France and Belgium, and commercial treaties with the states of South America. He assumed the reins of government Sept. 16, 1855. On May 18, 1858, he married the princess Stephanie of Hohenzollern-Sigmaringen, who died July 17, 1859.

PEDRO THE CRUEL, king of Castile and Leon, born in Burgos, Aug. 30, 1334, killed March 14, 1369. He succeeded his father Alfonso XI. in 1350, and in 1353 married Blanche de Bourbon, sister of the king of France, but in three days deserted her, and devoted himself to his mistress Donna Maria Padilla, whose relatives he raised to the highest offices. Subsequently he poisoned his queen, and cruelly persecuted members of his own family and Castilian grandees, until an insurrection was raised against him under the lead of Henry of Trastamara, his natural brother, who claimed the throne. At the same time the pope excommunicated the king and laid his kingdom under an interdict. Henry was defeated and driven to France, but in 1366 revived his claim to the throne, in which he was supported by the pope and Charles V. of France. Pedro sought refuge in Bayonne, where he obtained the assistance of Edward the Black Prince, who placed him again on the throne; but disgusted with his conduct he left him to his fate, and in the battle of Montiel, in La Mancha, Pedro was defeated, and slain by the hand of his rival, who succeeded him under the title of Henry II.

PEDRO, DOM, duke of Coimbra, and regent of Portugal, born in Lisbon, Dec. 9, 1392, died May 20, 1449. He was the second son of John I. of Portugal and Philippa of Lancaster, daughter of John of Gaunt. While yet young he was intrusted with the command of the first expedition against Ceuta. He next devoted 4 years (1424-'8) to travel, visiting all the courts of Europe, and penetrating even to Bagdad, where the sultan received him with great magnificence. At Venice the republic presented him with the works of Marco Polo, which were reproduced in Portugal. After the death of Edward I. the people became discontented with the regency of the queen, who had been appointed to that office during the minority of Alfonso V. Dom Pedro skilfully fomented the dissatisfaction, and was nominated by the cortes defender and regent of the kingdom, Nov. 1, 1439. He abolished undue taxation, encouraged maritime enterprise, was the patron of letters and the arts, and himself a poet of no mean pretensions. He succeeded in bringing about a marriage between his daughter Isabella and the young king (1446). A quarrel between himself and his illegitimate brother the duke of Bragança, each claiming the dignity of constable of the kingdom, broke out into open rupture and finally into civil war. Bragança gained the king to his interest. Pedro having retired to Coimbra, but not caring to sustain a siege, advanced to meet the royal troops with a force of 1,000 horse and 5,000 infantry. The hostile armies met at Alfarrobeira, May 20, 1449, and a battle ensued, in which the regent's forces were defeated. In the thick of the fight Dom Pedro was killed by an arrow. His friend, the chivalrous Almada, was also slain. The duke's head was cut off and his body left exposed on the field, but after the lapse of 4 days was buried by the enemy in a chapel hard by, whence at the entreaty of the queen it was permitted to be removed to the family vault in the monastery of Batalha, in 1455.

PEEBLESSHIRE, or TWEEDDALE, an inland county in the S. of Scotland, bounded N. by Edinburghshire, E. by Selkirkshire, S. by Dumfriesshire, and W. by Lanarkshire; area, 319 sq. m.; pop. in 1851, 10,738. It is watered by the Tweed. The greater part of the surface consists of mountain, moor, and bog, the elevation of the first varying from 2,400 to 2,800 feet. Coal and limestone have been long wrought in various places. There are manufactories of woollens. Peeblesshire returns one member to parliament.

PEEL. I. **Sir Robert**, an English manufacturer, born at Peel's Cross, near Lancaster, April 25, 1750, died at Drayton Manor, Staffordshire, May 3, 1830. He inherited a moderate property, and in 1773 entered into partnership with William Yates, a cotton manufacturer of Bury, Lancashire, whose daughter he married in 1783. By industry, activity, boldness of enterprise, and consummate sagacity, he amassed a fortune before reaching middle life; but he nevertheless continued to conduct business as a manufacturer for many years subsequent with uninterrupted prosperity, having had, it is said, in 1803 upward of 15,000 persons in his employ. In 1780 he published a pamphlet entitled "The National Debt productive of National Prosperity;" and in 1790 he was returned to parliament as one of the members from Tamworth, a constituency which he continued to represent until 1820. In politics he was a stanch supporter of Pitt and the tories, and in 1797 he testified his loyalty and patriotism by subscribing, in conjunction with Mr. Yates, the sum of £10,000 to the "loyalty loan." During the alarm caused by the threatened invasion of the French he was active in the formation of volunteer corps, and raised among his own workmen a regiment called the Bury loyal volunteers, of which he was appointed lieutenant-colonel. In 1800 he was created a baronet. He left property, real and personal, estimated at above two millions sterling, the greater part of which, after liberal provisions for his numerous family, was settled on his eldest son. II. **Sir Robert**, eldest son of the preceding, an English statesman, born near Bury, Lancashire, Feb. 5, 1788, died in London, July 2, 1850. He received his early education under the personal superintendence of his father, and was subsequently sent to Harrow, where his industry and ambition soon placed him at the head of the school. "There were always great hopes of Peel among us all, masters and scholars," writes Byron, who was his schoolfellow, "and he has not disappointed them." At 16 he was entered a gentleman commoner of Christchurch, Oxford, and was graduated in 1808 with unprecedented distinction, being the first who ever took the honors of a double first class—first in classics and first in mathematics. Upon attaining his majority in 1809 he was returned to parliament for the Irish borough of Cashel, and entered public life as a member of the tory party. His university reputation and his father's praises drew toward him more attention than is generally paid to young men entering upon a political career; and he was wise enough during his first year of parliamentary life not to risk his prestige by any set speech, contenting himself with brief remarks on comparatively unimportant occasions. In 1810 he seconded the address in reply to the king's speech, and in 1811 was appointed under secretary of state for the colonies, a position not at that time of much prominence, but which he filled with credit. In Sept. 1812, he was appointed chief secretary for Ireland, an office then commonly bestowed upon the most promising of the youthful members of the party in power. In the then disturbed political condition of Ireland the arrival of a secretary holding the high tory principles of Mr. Peel, and opposed to Catholic emancipation, was the signal for an attack upon him, which was maintained with unwavering severity during his whole term of office. No term of reproach was considered too strong, no abuse too violent, and the ultra Roman Catholics seldom called him by any other appellation than "Orange Peel." O'Connell, who was then the popular idol of the opposition, singled him out for attack, and for the virulence of his language was challenged by Peel, who proceeded to the continent to afford his adversary a hostile meeting; but the duel was prevented by the arrest of O'Connell in London. His most important act while in Ireland was the establishment of the regular Irish constabulary, nicknamed the "Peelers," which was the first step toward the introduction of that system of metropolitan police now familiar to every considerable provincial town of Great Britain. In 1817 he was returned to parliament for the university of Oxford; and in the succeeding year he resigned his Irish secretaryship, and succeeded Mr. Horner as chairman of the bullion committee, in which capacity he introduced in 1819 the bill authorizing a return to cash payments which bears his name. It brought upon him no slight odium, and was the first political act in which his father, who still held his seat in parliament and was a stanch supporter of Pitt's currency doctrines, differed from him. In 1822 he succeeded Lord Sidmouth as home secretary, and during his term of office procured the passage of an important series of acts reforming and remodelling the criminal law. Upon the dissolution of the Liverpool ministry in 1827 he retired from office; but upon the accession of the tory government of the duke of Wellington in 1828, he resumed the seals of the home department. The agitation of the repeal of the penal laws affecting the Roman Catholics had now reached a point which compelled the ministry either to consent to the measure or to resign office; and in a speech delivered on March 5, 1829, Mr. Peel, yielding to what he considered the exigencies of the moment, proposed Catholic emancipation. The orthodox tories at once denounced him as an apostate; and upon offering himself to the electors of Oxford university, his seat for which he had resigned upon becoming a convert to emancipation, he was defeated by Sir Robert H. Inglis. He was however temporarily returned for the borough of Westbury, and in 1830 became one of the members for Tamworth, which constituency he represented until his death. During the respite which the ministry gained by their concession Mr. Peel remodelled on its present basis the London police force—a measure with which his name will ever be honorably connected. He retired with his colleagues in Nov. 1830, having a few months previous succeeded to the baronetcy and the greater part of the immense estates of his father, and for the next 4 years remained in opposition. He opposed the reform bill with earnestness and ability, but with impaired influence; and in the first session of the reformed parliament he found himself at the head of a party numbering not more than 200, but which under his guidance was developed into a compact, powerful, and well disciplined opposition. In 1834, upon the dissolution of the Melbourne ministry, he was summoned by the king from Italy to form an administration, which he undertook, although of the opinion that the time was inopportune to attempt a conservative reaction. For several months he struggled against a formidable opposition, but was obliged in April, 1835, to retire. For 6 years he remained in opposition, having within that time declined to form a cabinet, owing to the refusal of Queen Victoria to dismiss certain ladies of her household having whig connections; and in Sept. 1841, he became first lord of the treasury, with a large and well organized majority in both houses of parliament. His ministry, though formed emphatically on protectionist principles, did not hesitate ultimately to adopt free trade doctrines; and Sir Robert himself inaugurated in 1842 a more liberal financial policy by removing the duties on certain articles of import, and considerably abating them on many others, including breadstuffs and raw materials of manufacture. At the same time an income tax for 3 years was imposed, by which the government was enabled to repeal upward of £12,000,000 of indirect taxes. In 1845 this tax was renewed for 3 years; and in 1846, in view of the approach of famine in Ireland, the premier carried a total abolition of duties on breadstuffs. So great a change in the commercial policy of the kingdom brought upon Sir Robert a large degree of odium among the agricultural classes, whose interests, it was supposed, would be ruined by the repeal of the corn laws. A coalition of the protectionists and the whigs, the former led by Disraeli and Lord George Bentinck, overthrew him on the Irish coercion bill, and on June 29, 1846, he resigned office. In addition to the measures mentioned, his administration was distinguished by several of a liberal character touching Ireland, and for relieving the disabilities of the dissenters and Jews. Its foreign policy was also conducted with success in Europe and the East. On the other hand, Sir Robert did nothing to check the railway mania of 1845-'6, but rather encouraged it, as a source of prosperity. Although out of office, he still retained much influence, and his efforts tended to repeal the navigation laws and to advance the principle of Jewish emancipation. He spoke for the last time in parliament on June 28, 1850, in opposition to Lord Palmerston's foreign policy, as exemplified in the Greek question. On the succeeding day, while riding on Constitution hill, he was thrown from his horse, and died after great physical suffering in consequence of the injuries received. His death excited a universal feeling of regret. It was admitted by those who differed with him on the great political measures he successfully advocated, that no man ever undertook public affairs with a more thorough determination to leave the institutions of his country in an orderly, honest, and efficient condition; and his friend the duke of Wellington once observed of him: "Of all the men I ever knew, he had the greatest regard for truth." In private life he was honored by all classes. Of his simplicity and independence of character it is sufficient to record that he declined a peerage and the order of the garter, and left in his will a solemn injunction to his children against the acceptance of such honors. By his wife, a daughter of Gen. Sir John Floyd, he left 7 children, 5 sons and 2 daughters, all of whom survived him. III. Sir Robert, eldest son of the preceding, born in London, May 4, 1822. He was educated at Harrow school and the university of Cambridge, and entered public life in 1844 as an *attaché* to the British embassy at Madrid. Subsequently he served as secretary of legation and *chargé* in Switzerland; was a junior lord of the admiralty from 1855 to 1857; and in the latter year was present at the coronation of Alexander II. of Russia, as secretary of the special mission despatched by the British government to Moscow. He succeeded his father in 1850, and since that period has represented Tamworth in parliament. In 1856 he was married to Lady Emily Hay, daughter of the marquis of Tweeddale. IV. Frederic, brother of the preceding, born in London, Oct. 26, 1823. He was educated at Harrow and at Trinity college, Cambridge, and in 1849 was called to the bar at the Inner Temple. From Nov. 1851, to Feb. 1855, with the exception of several months in 1852, he was under secretary for the colonies, and from 1855 to 1857 under secretary for war; and since 1860 he has been one of the secretaries of the treasury. In 1859 he was returned to parliament from Bury for a second time.

PEELE, George, an English dramatist, born in Devonshire about 1552 or 1553, died probably shortly previous to 1598. He was educated at Broadgates hall, now Pembroke college, Oxford, where he took his bachelor's degree in 1577, subsequently established himself in London, and became a writer for the theatre, an occasional performer, and an intimate associate of Nash, Marlowe, and Greene. Like many of the contemporary dramatists, he shortened his life by dissipation. Six dramas by him, comprising, however, probably not more than half of his works of this class, have been collected by Mr. Dyce, together with poems and miscellaneous writings (3 vols., 1828-'39). His best play, "The Love of King David and Fair Bethsabe with the Tragedy of Absalom," is pronounced by Campbell "the earliest fountain of pathos and harmony that can be traced in our dramatic poetry."

PEER (Lat. *par*, equal; Fr. *pair*), a term originally applied, in the feudal law, to all the vassals of the same lord, because, whatever might be their relative condition, they were all equally his vassals, and bound to render their feudal service in his courts, or in war. It is now applied sometimes to those who are impanelled in an inquest for trial of any person; for they are not only peers with each other, as having equal power and an equal duty, but by the common law of England every man is to be tried "by his peers." In the United States this principle has no practical application, as all are equal in law where no one has any legal rank. In England the word is most commonly used to designate a lord of parliament, all of whom are called "the king's peers," not because they are in any sense equal with the king, but because they constitute his highest court, and, whatever may be the degree of their nobility, all, as nobles, are equal in the discharge of their official duty, as in their votes in parliament, or upon the trial of any person impeached by the commons; and all share alike in all the privileges of the peerage. (See Lords, House of, and Parliament.) The different degrees of English nobility are, in the order of precedence, duke, marquis, earl (which corresponds in English to the word count on the continent of Europe), viscount, and baron. The eldest son of the first three is usually called by his father's second title, and their other sons by the term lord prefixed to their names. These titles are called titles of courtesy, their bearers having no legal right to them. The sons of a viscount are called honorable.—In France, the word *pair* has remained in use through all the governments from feudal times, and is in use now; but the functions and privileges of the peerage have varied very much at different times, the term being destitute of the definite meaning which it has attained in England. Louis XVIII. in 1814 established a house of lords, or more accurately a peerage, in some degree resembling the English system; but Villèle, the minister of Charles X., created at one time 76 new peers, when he wanted them for a political purpose.—A peeress is a woman who is noble by descent, by creation, or by marriage. A peeress by descent or by creation retains her title and nobility in law, although she marries a commoner; but a peeress by marriage loses her nobility by her marriage with a commoner, but commonly retains her title in society as a title of courtesy. It is one of the privileges of the peerage of the realm not to be liable to arrest for debt. This rule applies equally to peeresses, who are peers of the realm, and can only be tried by their peers, although they cannot sit in parliament or on trials.

PEET, Harvey Prindle, LL.D., an American instructor of the deaf and dumb, born in Bethlehem, Litchfield co., Conn., Nov. 19, 1794. His father was a farmer. At the age of 16, and for 5 winters subsequently, he taught a district school, and was afterward an assistant instructor in private academies. In 1816 he went to Phillips academy, Andover, Mass., fitted himself for college, supporting himself entirely by his own exertions, entered Yale college in 1818, and was graduated in 1822. It was his purpose to study theology, but he accepted an invitation to engage as an instructor of the deaf and dumb in the asylum at Hartford, where he was soon appointed steward. In 1831 he was appointed principal of the institution for the deaf and dumb at New York. For some years he was principal, superintendent or steward, teacher, and chaplain, as well as secretary of the board of directors, and managed all the details of the institution alone. He appealed to the legislature for the extension of the advantages of instruction to all the poor deaf mutes of suitable age in the state, and visited with a class of pupils the principal cities and villages of the state, exhibiting the success of his method of instruction. The want of suitable books for elementary teaching of the classes led him to prepare a series which are now in general use in the institutions for deaf mutes in this country, and to some extent in Great Britain. He also investigated the modes of instruction adopted in other countries, and particularly the instruction in articulation in Germany. He was a contributor to the "American Annals of the Deaf and Dumb" from its commencement, and is now one of its directors. From 1845 to 1859 he was president of the institution in New York, retaining his position as principal, which he still holds. In 1851 he visited Europe with three of his pupils, and made a careful examination of the principal deaf-mute institutions of England and the continent. He received the honorary degree of LL.D. from the regents of the university of the state of New York in 1849. In addition to the "Course of Instruction" and the "Scripture Lessons," he is the author of a great number of works on the education of the deaf and dumb.

PEET-WEET, a common name of the spotted sandpiper (*tringoides macularius*, Gray), derived from its note.

PEGASUS, in Grecian mythology, a winged horse which sprang from Medusa when Perseus struck off her head for having intercourse with Neptune. His place, according to the most ancient writers, was in the palace of Jupiter, whose thunderbolts he carried; but later authors place him among the stars as the horse of Aurora. When Bellerophon was endeavoring to kill the Chimæra, Minerva gave him a golden bridle with which he caught Pegasus, and having slain the monster by his means, endeavored to rise upon his back to heaven; but Jupiter sent a fly to sting the horse, and caused the rider to be thrown. When Mt. Helicon rose heavenward with delight at the singing of the Muses, Pegasus by advice of Neptune stopped its ascent with a kick; and on the spot where his hoof touched the ground there sprang up Hippocrene, the inspiring well of the Muses. In the later writers Pegasus is known almost exclusively as the horse of the Muses.

PEGU, a British province of Indo-China (Further India), on the E. side of the bay of Bengal, bounded N. by the Burmese empire, E. by the Tenasserim provinces, S. by the gulf of Martaban, and W. by the province of Aracan and the bay of Bengal, extending from lat. 15° 40' to 19° 30' N., and from long. 94° 11' to 96° 55' E.; extreme length 240 m., breadth 170 m.; area, 32,300 sq. m.; pop. 570,180. The most important towns are Rangoon, Martaban, Pegu, and Prome. The whole province is intersected by branches of the Irrawaddy, which flows S. from Burmah, and enters the gulf of Martaban by an extensive delta, affording several good harbors. The Sitang forms the E. boundary line; and both these rivers are navigable by vessels of considerable size to distances far beyond the limits of Pegu. The Youmadoung mountains extend along a great part of the W. frontier, but the surface in other directions is level or undulating. The minerals include iron, tin, lead, and several kinds of precious stones. The climate is warm and moist, but is not considered unhealthy. The soil is remarkably fertile, and vegetation is luxuriant. Much of the surface is covered with forests, and agriculture has been neglected, land that was cultivated formerly being now overrun with jungle. The principal productions consist of rice, timber, particularly teak, gums, ivory, and various woods used in dyeing.—Pegu was formerly an independent kingdom, but after a series of contests, extending over many ages, it was conquered by the Burmese assisted by the Portuguese. The Peguans revolted about the middle of the 18th century, subdued the Burmese, and made their king prisoner. A long series of wars followed, in which the Burmese were assisted by the English and the Peguans by the French; and the former at length became masters of the country. In 1824 war broke out between the British and Burmese, and among other provinces Pegu was conquered, but restored at the conclusion of hostilities in 1826. The imprisonment of the master of a ship, and some other British subjects, by the governor of Rangoon, led to a second war in 1852, which resulted in Pegu being annexed to the English possessions in India. (See BURMAH.)—PEGU, a town in the above described province, is situated on a river of the same name, which falls into the Irrawaddy 58 m. N. E. from Rangoon; pop. about 10,000. The streets are broad and regular, and paved with bricks, and the houses are built of wood and elevated on posts. There is a remarkable pagoda, shaped like a pyramid, built of brick of an octagonal form at the base, each side measuring 162 feet. Pegu is said to have formerly contained 150,000 inhabitants, but it was utterly destroyed by the Burmese in their final triumph over the country in 1757. It has since been rebuilt, and the population is fast increasing. It was captured by the British in June, 1852.

PEI-HO, or NORTH RIVER, a river of China, which rises in the highlands of Mantchooria, about lat. 40° 30' N., long. 112° 20' E., and after a very circuitous but generally E. course of 350 m. flows into the gulf of Pe-che-li in lat. 38° 30' N., long. 117° 47' E. Near the mouth of the river are the villages of Ta-ku and Si-ku, and a little higher up Tang-ku; but the most important town on the Pei-ho, and the largest port N. of Shanghai, is Tien-tsin at the junction of the grand canal, about 70 m. from the sea. Tung-chau, where all the boats land their passengers and cargoes for Peking, is situated 110 m. higher up, or by the sinuosities of the river 180 m. from Ta-ku. The principal tributaries of the Pei-ho are the Hoen-ho, Tsya, Chu-lung, and Tung-hui; upon the last named, 13 m. from the main stream, Peking is situated. The velocity of the stream, arising from the great altitude of its source, has scoured out a narrow channel through the deep alluvial plain of Pe-che-li, and cut into the substratum of clay beneath it. For the last 5 m. of its course the plain is little if at all above the level of high water at spring tides, and the current consequently becomes much weakened and the river discharges itself over an extensive bar. This bar is formed of tenacious clay, and the distance at low water from a depth of 10 feet without to 10 feet within is nearly 4½ m. In the channel leading over the bar there is a depth of 11 feet at high water; but at low water there is only 24 inches in most places, and extensive dry mud banks on either hand. Within the bar the channel winds upward for about a mile between steep mud banks, which are covered at high water, and render navigation at that time very dangerous. At this distance the banks become covered with reeds, the breadth is about 100 yards, and the current runs from 2 to 3 m. per hour. Forts and earthworks have been erected upon natural or artificial mounds with an altitude of from 10 to 12 feet at high water, and, from the peculiar configuration of this reach, face and flank it on all sides.—The mouth of the Pei-ho was the scene of an engagement between English and French gun boats and land forces and the Chinese on May 19, 1858, in which the Chinese were defeated. Another attack was made on the forts, June 25, 1859, by 11 English gun boats, manned by 500 men, with 700 marines, when the English were repulsed with a loss of 89 killed and 345 wounded. On Aug. 21, 1860, the attack was renewed with an English and French fleet of 200 sail and a land force of 25,000 men. The Chinese fortifications were captured and destroyed. The English lost 19 killed and 182 wounded; the French, 30 killed and 100 wounded; the Chinese loss was estimated at 3,000.

PEINE FORTE ET DURE. Formerly, in England, when a prisoner indicted for a capital felony or petit treason stood mute, as the phrase was, upon his arraignment, that is, refused to plead and so to put himself upon his trial in the mode which the law prescribed, answering either not at all, or impertinently, to the charge preferred against him, he was condemned to the punishment of *peine forte et dure.* This was the penalty of his contempt in refusing to submit himself to the legal form of trial. It wrought a forfeiture of goods, but no attainder and corruption of blood, and, therefore, no escheat of lands. The *peine forte et dure* was an infliction of extreme severity. The books of entries and other old books of the law, varying only slightly in the description of the punishment, agree that the prisoner was carried back to prison, and laid in some low, dark room, almost naked, upon his back; his body was burdened with very heavy weights; he received once each day portions of the meanest bread and water, of bread one day and of water the next, and so on alternately; and thus he continued until he died. In early times, it is supposed, the torture lasted only until the prisoner declared himself willing to plead; but later, says Hawkins, he could not save himself, if once the punishment had been ordered. Women were subjected to the same torture.—It is matter of dispute how and when *peine forte et dure* was introduced; whether it existed at common law, or was created by legislative provision. The statute Westminster the first, c. 3, which was enacted in the time of Edward I. (and there is no mention of this penalty before that reign), says that felons standing mute shall be put in *prison forte et dure;* and as it does not explain these words at all, it seems to imply that their meaning was already familiar in practice. Sir Edward Coke contends therefore that the punishment was known before the statute; that by no construction of the words of the act, *prison forte et dure*, could judges have framed so rigorous a sentence as that which we have just described; and as there is confessedly no other statute to which it can be referred, it must be presumed that it existed at common law. Sir Matthew Hale adopts this opinion, and Hawkins seems also to assent to it. It may be suggested in behalf of this view, that the author of Fleta and Britton, both of whom wrote near the time of the above named statute and commented on it, do not refer to it the origin of the *peine forte et dure*, nor give indeed any particular prominence to the similar words of the act, though it is highly probable that they would have done so if this statute had created this, in any age, remarkable penalty. On the other hand, Blackstone thinks that the punishment had a statutable origin. He urges that neither Bracton nor Glanvil, nor any other ancient author previous to Edward I., makes mention of it, and in fact traces its introduction to the language of the statute of Westminster the first. He concludes, however, that this requires imprisonment only, and says that the practice of loading the felon's body with weights was a purely merciful device, which had gradually established itself between the reigns of Edward III. and Henry IV., and was designed to deliver the prisoner the sooner from his sufferings. The penalty of *peine forte et dure* was not abolished until the 12th year of the reign of George III. (1772).—At common law a refusal to plead to an indictment of felony saved the accused from the form of trial, and therefore from conviction and its consequences, corruption of blood and escheat of his estate; and it was for the purpose of extorting a plea and of securing their escheats and forfeitures, that the feudal lords devised this penalty of a cruel death. Generally, no doubt, the device accomplished its end; though there were instances of persons who suffered death in this mode in order to preserve their estates to their families. The statute 12 George III., c. 20, prevented further need of this harsh coercion, by providing that, if any person thereafter should stand mute on his arraignment, he should be convicted of the felony charged, and judgment and its consequences should follow in the same manner as if such person had been convicted by verdict or confession of the felony charged against him.—The only instance, so far as we are aware, in which *peine forte et dure* has been inflicted in this country, was when in Massachusetts, in 1692, Giles Cory, an old man of 80 years and the husband of a reputed witch, stood mute upon his trial, and was condemned to be pressed to death.

PEIPUS, Lake, or **Tchudio Lake**, a lake of European Russia, bounded by the government of Esthonia, St. Petersburg, Pskov, and Livonia; extreme length 100 m., breadth from 15 to 35 m.; area about 1,500 sq. m. The southern part is connected with the northern by a strait, and is sometimes called Lake Pskov, the town of that name being situated at its S. E. extremity. There are several small islands at both ends of the strait. Peipus receives the rivers Embach and Kosa from the S. W., and the Tcherna and Yaetsha from the E. and S. E; and the Narva flows to the gulf of Finland from the N. E. end. The shores are low and marshy, and the greatest depth is about 60 feet.

PEIRCE, Benjamin, LL.D., an American mathematician, born in Salem, Mass., April 4, 1809. He was graduated at Harvard college in 1829, and after teaching for two years in the Round Hill school at Northampton, was appointed tutor in mathematics at Cambridge in 1831, university professor of mathematics and natural philosophy in 1833, and Perkins professor of astronomy and mathematics in 1842. He still holds the last office, as also that of consulting astronomer to the "American Ephemeris and Nautical Almanac," to which position he was appointed upon the establishment of the almanac in 1849. He is a member of the leading scientific societies of the United States, and was elected an associate of the royal astronomical society of London in 1849; member of the royal society of London in 1852;

president of the American association for the advancement of science for the Cleveland meeting in 1853; and one of the scientific council which established the Dudley observatory in 1855. The mathematical powers of Prof. Peirce were prominently manifested in early life. He was a pupil of Dr. Bowditch, and the proof sheets of the translation of the *Mécanique céleste* passed under his scrutiny and supervision before going to the press. When the late Mr. Gill edited the "Mathematical Miscellany," Prof. Peirce was among the most efficient contributors. Afterward he himself undertook the publication of the "Cambridge Miscellany of Mathematics, Physics, and Astronomy," of which however only 5 numbers appeared. It was in this that he gave his celebrated and exhaustive discussion of the motion of a top spinning upon a plane surface. A series of text books on the different branches of mathematics, prepared by Prof. Peirce during the years 1836–'46, attracted the attention of scientific men by their originality, and the singular power of generalization and condensation which they displayed. The return of Encke's comet in 1842, and the appearance of the great comet of February and March, 1843, served as an opportunity for Prof. Peirce to attract public attention to the need of a well furnished observatory for the college, and to his efforts the movement was due which resulted in the establishment of the present well endowed institution. The first of his investigations which may be said to have compelled the notice of scientific men throughout the world was his criticism of the computations and results of Leverrier, upon which this geometer based his demonstration of the existence and place of the unknown planet to whose attraction the irregularities observed in the motions of Uranus were to be attributed. In the face of the striking accordance between the direction of the planet predicted by Leverrier, and that of the planet Neptune discovered by Galle, searching at Leverrier's request, Peirce boldly announced to the American academy that the planet Neptune did not accord with the computations of Leverrier, and declared that its true position in space and its movements were incompatible with them. A statement apparently so improbable attracted great attention and severe criticism. It is related that Mr. Edward Everett, being present at the meeting, actually addressed the academy upon the subject, and begged that so utterly improbable a declaration might not go out to the world with the academy's sanction. "It may be utterly improbable," retorted Peirce, "but one thing is more improbable still, that the law of gravitation and the truth of mathematical formulas should fail!" Prof. Peirce followed up his announcement by a thorough discussion of the mutual influences of Uranus and Neptune, which, in conjunction with the computations of Walker, soon placed the theory of the new planet upon a firm basis. The fluidity of Saturn's rings was discovered and announced by Peirce in 1851, and demonstrated from purely analytical considerations. In the full demonstration, which for peculiar reasons he withheld for two years, he established the important fact that no ring is capable of sustaining itself in stable equilibrium about a primary without the support afforded by the attraction of satellites properly situated for the purpose, nor under any circumstances if solid. During the following year Prof. Peirce prepared a volume of lunar tables for the use of the American "Nautical Almanac." Though founded upon the general theory of Plana by the employment of coefficients in a manner empirical, and only intended by the author to serve a temporary purpose until the long expected tables of Hansen should appear, they still represent the observed places of the moon with such precision, that they are yet (1861) employed in the almanac office as the basis of all the computations into which the place of the moon enters. Detailed comparisons of the errors of these tables with those of Hansen's, as determined by actual observation, have been published in the "Astronomical Journal," and show that the accordance of Peirce's tables during the last 13 years is quite comparable with that of the tables which Hansen had obtained from 10 years of profound research. In 1857 appeared Peirce's "Treatise on Analytic Mechanics" (4to.), designed to form one of a series of 4 treatises, the others being respectively upon "Celestial Mechanics," "Potential Physics," and "Analytic Morphology." As one of the scientific council of the Dudley observatory, he took an active part in the struggle in 1858 between that body and the trustees of the institution, and in conjunction with Professors Bache and Henry published the defence of the director of the observatory. Among the discoveries and important investigations of Prof. Peirce, are especially to be named his theory of the tails of comets, published in the "Astronomical Journal," showing the mode and laws of their formation; his methods of investigating terrestrial longitudes and the form of the moon's limb by means of occultations of the Pleiades, published in the report of the superintendent of the coast survey; his researches upon personal equation, showing the existence and means of measurement of a new and before unrecognized form of personal error, in observations "by eye and ear," arising from the proneness of every individual to award an undue prominence to particular fractions of the second; and the singular and valuable "Criterion for the Rejection of Doubtful Observations," by means of which the propriety of exclusion of specially discordant observations from a series, is definitely determined in each individual case by the mathematical laws of probability, and removed from the arbitrary or uncertain judgment of the computer. He has also investigated the forms of equilibrium of an elastic sack containing a fluid, researches which conducted him to his favorite theory of analytic morphology; the phyllotactic series of numbers; and the curious and elegant cyclic solution of the celebrated "school-girl puzzle," to which problem its author had found no symmetrical solution whatsoever. Prof. Peirce received the degree of LL.D. from the university of North Carolina in 1847.

PEIRCE, Bradford K., an American clergyman, and founder of a reformatory school for girls, born in Royalton, Vt., Feb. 3, 1819. He was graduated at the Wesleyan university, Middletown, Conn., in 1841, and in 1842 was received as a Methodist minister into the New England conference, and stationed at Waltham, Mass. He was subsequently transferred to Newburyport, Charlestown, and Boston. His health failing, he received a local relation, and spent the next 10 years in Roxbury, Mass. During this period he prepared a series of biblical question books for Sunday schools, a "Bible Scholars' Manual," a "Commentary upon the Book of Acts," and several small books for Sunday schools. He also published a volume entitled "The Eminent Dead," which had a very large sale. In 1850 he was appointed agent for New England of the American Sunday school union. In 1855 and 1856 he was elected state senator from Norfolk co. He now entered heartily into a movement for establishing a reform school for girls, and when it was organized, under the name of the state industrial school for girls, at Lancaster, Mass., was appointed (March, 1856) superintendent and chaplain of the institution, a position which he still holds. The school was opened Aug. 26, 1856, under a plan proposed by Mr. Peirce. It is exclusively for girls, between the ages of 7 and 16, who have been guilty of petty crimes, or are exposed to the danger of a vicious life. They are examined by a board of commissioners appointed by the governor, having been committed on the warrant of a judge of probate. They are divided into families of 30, each under the care of a matron and two assistants. On the grounds, which comprise about 80 acres, there are 4 "homes," and a chapel and residences for the superintendent and the farmer. There are no walls or high fences, the restraints being wholly moral. Corporal punishment is not permitted, and the whole management is that of a well ordered family. It has been thus far successful, more than 100 girls having been sent out into society completely reformed.

PEIRCE, Cyrus, an American teacher, born in Waltham, Mass., Aug. 15, 1790, died in West Newton, Mass., in May, 1859. He was graduated at Harvard college in 1810, and immediately afterward took charge of a private school in Nantucket, where he taught for 2 years. He then returned to Cambridge, and studied theology for 3 years, after which he resumed his school at Nantucket. In 1818 he commenced preaching, and in the following year was settled as minister of a Congregational church at North Reading, Mass., where he remained for 8 years. He felt, however, that teaching rather than preaching was his vocation, and at last withdrew from the ministry, and in connection with a relative, Mr. Simeon Putnam, opened a school at North Andover. In 1830, in compliance with repeated solicitations, he returned to Nantucket, and for 6 years managed a large school with hardly a resort to the use of the rod, but with the most perfect order and success. By his urgent advice and in accordance with a plan devised mainly by him, the public schools of Nantucket were reorganized upon a thorough system of gradation, embracing primary, intermediate, and grammar schools, and a high school. Of this last he became the principal in 1837. In 1839 he was chosen principal of the normal school just founded at Lexington, Mass., the first institution of the kind established in America. The duties of this position proved too arduous for his health, and at the end of 3 years he was obliged to resign. After 2 years of rest he took charge of the female normal school, now removed from Lexington to West Newton. In 1849 he was again compelled to resign, and made a voyage to Europe, his friends and pupils having raised a purse of $500 to defray his expenses. After his return in 1850, his health being partially restored, he became an assistant in a school at West Newton, and there continued to teach till near the close of his life. He published a "Letter on Normal Schools," addressed to the Hon. Henry Barnard (1851), and a prize essay on "Crime, its Cause and Cure" (1853).

PEIRESC, Nicolas Claude Fabri, seigneur de, a French scholar, born in Beaugensier, Provence, in 1580, died in Aix in 1637. He travelled in Italy, Holland, and Great Britain, became acquainted with most of the scientific and literary men in those countries, and extended his researches to nearly every branch of human learning. He possessed a large fortune, which he applied to the patronage of scholars and men of letters, and the collection of books, antiquities, and works of art. Scaliger, Salmasius, Holstenius, Kircher, Mersenne, Grotius, and Valois were the recipients of his liberality. He devoted much attention to natural history, and imported into France several species of plants and trees. Although he published nothing, he was deservedly styled by Bayle the "procurator-general" of literature. Science is indebted to him for valuable observations and discoveries; he declared previous to Cuvier that fossil bones, which were considered remains of giants, belonged to well known animals. His death was almost universally mourned; the Roman society of "Humorists" alone published poems in his honor in no fewer than 40 different languages. Out of his voluminous correspondence, his letters to Holstenius are perhaps of the greatest interest. They may be found in Boissonade's *Holstenii Epistolæ ad Diversos* (8vo., Paris, 1819). His life was written in Latin by Gassendi (4to., Paris, 1641; translated by Rand, London, 1657).

PEKING, or PEKIN (Chinese *Pe-King*, northern capital), the capital of the Chinese empire and of the province of Chi-li, situated on the river Tung-hui, a small tributary of the Pei-ho, in lat. 39° 54' N., long. 116° 27' E., about 12 m. from the Pei-ho, 40 m. from the nearest part of the great wall, and 100 m. N. W. from the gulf of Pe-che-li; pop. about 2,000,000. It stands on an extensive sandy plain, and consists of two parts, Nui-ching, the Tartar city, to the N., and Wai-ching, the Chinese city, to the S. The Chinese city is a parallelogram in outline, with an area of 15 square miles; the Tartar city, which adjoins one of the longer sides of the other, is about 3½ miles square, or 12 square miles in area. Both these divisions are enclosed by walls about 50 feet high, 25 feet thick at the base, and 12 feet at the top. The walls consist, for the most part, of earth or rubbish, faced with stone or brick, laid in very durable cement composed of clay and lime. They are smooth, but not quite perpendicular on the outside, and on the inside the bricks *recede* one above another like steps; and there are sloping embankments at intervals to enable horsemen to ascend to the top. Square towers project 40 or 50 feet from the outside at distances of about 60 yards; and in some places there are ditches. Outside the walls there are several suburbs, and extensive earthworks upon the E., N., and W. sides of the Tartar city, the whole being nearly 25 m. in circumference. Upon approaching Peking, very little is seen of the buildings inside, and the principal relief to the monotony of the dead wall is the watch towers over the gates, the flag staffs in pairs before the different official residences, a few pagodas, and the tops of large clumps of trees. The cities are entered by 13 external gates; and there are 3 which open from the Tartar city into the Chinese. These gates are formed by arches, each surmounted by a wooden tower generally 5 stories high, with embrasures in each story closed by shutters upon which are painted bull's eyes that at a little distance have the appearance of guns. The gates are further defended by a semi-circular rampart in front of each, with towers at the ends, so that the entrance is from the sides and not from the front of the gate. The Tartar city consists of 3 enclosures, one within another, each surrounded by its own wall. The innermost contains the imperial palace and its surrounding buildings; the second is occupied by the several offices appertaining to the government, and by many private residents who receive special permission to reside within its limits; and the outer one, for the most part, consists of dwelling houses, with shops in the larger avenues.—The inner area is called Kin-ching, or prohibited city, and its circumference is about 2 m.; the wall is nearly as solid as that around the city, and is faced with glazed bricks and coped with yellow tiles. It is entered by 4 gates, each surmounted by a tower, which, with one in each corner, afford quarters for the troops and guard. The interior of this enclosure is divided into 3 parts by walls running from N. to S., and the whole is occupied by a suite of court yards and apartments which are superior to any other buildings of the kind in China. The S. gate, called Meridian gate, leads into the middle division, in which are the imperial buildings. It is reserved for the use of the emperor, and when he passes through it a bell and gong placed in the tower above are struck. When his troops return in triumph, the prisoners they bring are here presented to him; and here the presents he confers on vassals and ambassadors are bestowed with great pomp. Passing through this gate into a larger court, over a small creek spanned by 5 marble bridges which are ornamented with sculptures, a second court is entered, paved with marble and terminated on the sides by gates, porticos, and pillared corridors. At the head of this court is a superb marble structure 110 feet high, called the "gate of extensive peace." It is a sort of balcony where the emperor, on New Year's day, his birthday, and other occasions, receives the homage of his courtiers assembled in the court below; 5 flights of stairs decorated with balustrades and sculptures lead up to it, and 5 gates open through it into the next court yard. Beyond it are two halls, one where his majesty examines the implements used in the annual ploughing, and the other where he feasts his foreign guests and other distinguished persons on New Year's day. After ascending a stairway and passing another gate, the Kien-Tsing-kung, or the "tranquil palace" of heaven, is reached, into which no one can enter without special permission. In it is the council chamber, and here candidates for office are presented to the sovereign. It is the loftiest and most magnificent of all the palaces. Beyond it stands the "palace of earth's repose," where the empress rules her miniature court in the imperial harem; and between this and the N. wall of the prohibited city is the imperial flower garden, designed for the use of its inmates. The gardens are adorned with elegant pavilions, temples, and groves, and interspersed with canals, fountains, artificial lakes, and flower beds. In the E. division of the prohibited city are the offices of the cabinet and the treasury. North of these is the "hall of intense thought," where sacrifices are offered to Confucius and other sages; near this is the library, a catalogue of the contents of which is published from time to time. At the N. end of the E. division are numerous palaces and buildings occupied by princes of the blood and their connections; and in this quarter is situated the Fung-sien-tien, a small temple where the emperor comes to bless his ancestors. The W. division contains a great variety of edifices devoted to public and private purposes, among which may be mentioned the hall of distinguished sovereigns, statesmen, and literati, the printing office, the court of comptrollers for regulating the receipts and disbursements of the court, and the Ching-hwang-mian, or guardian temple of the city. The number of people within the prohibited city is not very great, and most of them are Mantchoos.—The second enclosure, which surrounds the one just described, is called Hwang-ching, or imperial city, and is of oblong form about 6 m. in circuit. It is enclosed by a wall about 20 feet high, entered by 4 gates, and none may pass through them without special permission. From the S. gate, called the "gate of heavenly rest," a broad avenue leads up to the prohibited city; in front of it, outside the wall, is an extensive enclosure having an entrance from the S. which no one is permitted to pass through except on foot. On the right of the avenue within the imperial city is a large collection of buildings surrounded by a wall, where offerings are presented before the tablets of deceased emperors and empresses, and worship is performed by the members of the imperial family and clan to their departed forefathers. Upon the opposite side of the avenue is the altar of the gods of the land and grain, where in spring and autumn the emperor alone makes offerings to these divinities, who are supposed to have been originally men. On the E. side of the imperial city, N. of the great temple, and not far from the E. gate of the prohibited city, is a depository of military stores, with workshops for their manufacture. The establishment of the Russian college lies N. of this gate; and in the N. E. part of this side are the residences of the lamas, with numerous temples, monasteries, and other religious edifices. Much of this quarter is occupied by dwelling houses and by temples dedicated to various inferior gods in Chinese mythology. On the N. side, surrounded by a wall more than half a mile in circuit, is the King-shan, or artificial mountain, about 150 feet high, with 5 summits, each of which is crowned by a pavilion. Various kinds of trees border its base and line the paths leading to the tops, and the enclosure is enlivened by the presence of numerous animals and birds. The W. part is chiefly occupied by a park, in and around which are found some of the most beautiful spots in the metropolis. An artificial lake, more than a mile long, and with an average breadth of 220 yards, occupies the centre. It is crossed by a marble bridge of 9 arches, and its banks are shaded by groves of trees under which are well paved walks. There are many artificial hills of rock-work, groves, gardens, and parterres of flowers. On the S. E. side of the lake is a large summer house consisting of several edifices, partly in or over the water. On the W. side is the hall for the examination of military candidates, where the emperor in person witnesses their exhibitions of equestrian archery. At the N. end of the lake is a bridge leading to an islet, the centre of which presents the aspect of a hill of gentle ascent covered with groves, temples, and summer houses, and surmounted with a tower from which an extensive view of the metropolis is obtained. Near the N. E. end of the park is a temple dedicated to Yuenfi, the reputed discoverer of the silkworm, near which a plantation of mulberry trees and a cocoonery are maintained for the preparation of silk. In the neighborhood of the "temple of great happiness," and not far from the preceding, on the borders of the lake, is a gilded copper statue of Buddha, 60 feet high, with 100 arms.—The third or outer enclosure surrounding the imperial city is called the Tartar city, and consists of several wide streets crossing each other at right angles. The principal government offices are situated along the avenue leading S. from the imperial city to the Chinese city. Several boards have their bureaus on the E. side; the board of punishments, with its subordinate departments, has its courts on the W. side, and the censorate stands immediately S. of it. The astronomical board, the medical college, the national academy, and the colonial office are also on this avenue. Near the colonial office is the temple where the nearest ancestors of the reigning family are worshipped by his majesty and the princes of his family on the first day of every month. The temple is pleasantly situated in the midst of a grove, and the large enclosure around it is prettily laid out with trees and shrubbery. The observatory stands in the S. E., partly upon the wall. It was at one time superintended by the Roman Catholic missionaries, but is now confided to the care of Chinese astronomers, whose predecessors were instructed by them. Close to it is the hall of literary examinations, where the candidates of the province assemble to write their essays. The Russian church of the Assumption is in the N. E. corner, and near it is the splendid "temple of eternal peace" belonging to the lamas. The lamas have about 200 Chinese and Mantchoo pupils under their care, who learn the Thibetan language; and a similar college for the Chinese and Mantchoo languages stands near the temple. The Tartar city is under the control of the general of the nine gates, who is responsible for the peace and good order within its limits; the post is conferred only on Mantchoos. Near his establishment, or headquarters, which lie about half way between the imperial city and the N. wall, is a high tower containing an immense bell and drum which announce the hours of the night. This tower is higher than those over the gates, and is one of the most conspicuous objects seen when approaching the city; and the bell is said to weigh 120,000 lbs. A large number of Mohammedans reside near the S. W. corner of the imperial city, where they have a mosque. Their ancestors were brought from Toorkistan about a century ago, and all Mohammedans visiting Peking resort to the quarter where they reside. South of the mosque stands the "church of heaven's Lord," with a convent attached to it, which the Jesuits and Portuguese built during the time of their influence. It was the finest specimen of architecture in the place, but is now going to decay. There are thus religious edifices in the Chinese metropolis appropriated to many forms of religion; to the Greek and Latin churches, Islamism, Buddhism in its principal forms, rationalism, ancestral worship, and state worship, and temples dedicated to Confucius and other deified mortals, beside a great number in which the popular idols of the country are adored. Among them is the temple where the tablets of the kings and emperors of former dynasties are collectively worshipped, with the exception of a few who have been excluded on account of their wickedness. Near this is the white pagoda temple, so called from a costly obelisk near it erected by Kublai Khan in the 13th century, and rebuilt and exquisitely ornamented in 1819. This temple contains a scab taken from the forehead of Buddha, caused by his constantly knocking his head on the ground in worship; and around the edifice are 108 small pillars on which lamps are burned in his honor. Outside of the city on the E. is the "temple of heaven," which covers a large area and is surrounded with many spacious buildings; on the W. is a corresponding structure called the "temple of earth;" both of these are connected with the state religion.—The southern or Chinese city is more populous than the Tartar, but it contains few edifices of importance, is not so well built, and the walls are not so solid. The principal streets are more than 100 feet wide, and extend between gates at opposite sides of the city; but those which branch off from the chief thoroughfares are mere lanes. They are all unpaved, and according to the state of the weather are either knee-deep with mud or covered with dust. The houses are built of brick, and seldom exceed one story in height. They are roofed with tiles of many colors; and most of the private residences have a parapet wall in front, upon which pots containing flowers and shrubs are placed. In the back streets the edifices have a miserable and squalid appearance, but in the principal thoroughfares many of them, particularly the shops, are highly ornamented with painting and gilding. The shops are open in front, and the goods are exposed in heaps outside the doors. At each side of the establishment there is generally a wooden pillar or signboard, higher than the housetop, bearing inscriptions in gilt letters setting forth the superior qualities of the wares and the probity of the dealer. Flags and streamers are hung out from these posts, and lanterns of different material and form are arranged with great ingenuity and taste. Notwithstanding the breadth of the main streets, they are much obstructed by the wares exposed outside the shops, and the number of occupations that are carried on in tents and in the open air in movable workshops. This crowd and bustle, however, is wholly confined to the principal thoroughfares, and the lanes and cross streets are perfectly quiet. Where the main streets intersect, monuments of very curious appearance, bearing some resemblance to triumphal arches, are erected in honor of distinguished individuals. Upon the E. side of the avenue which leads from the S. gate of the Tartar city and adjoining the outer gate stands the altar to heaven, in an extensive enclosure. The altar is a round terrace consisting of 3 stages each 10 feet high, and respectively 120, 90, and 60 feet in diameter, paved with marble and protected with balustrades. Within the enclosure is also the "palace of abstinence," where the emperor fasts 3 days preparatory to offering the annual sacrifice at the winter solstice. On the opposite side of the avenue is the altar to earth, dedicated to the supposed inventor of agriculture; it stands in an enclosure about 2 m. in circumference, and in reality consists of 4 separate altars: to the spirits of the heavens, those of the earth, the planet Jupiter, and Shin-nung, the inventor of agriculture. The worship at this altar is performed at the vernal equinox, at which time the ceremony of ploughing a part of the enclosure is performed by the emperor, assisted by members of the board of rites. A little W. of this enclosure is the pool dedicated to the spirits of the waters, where his majesty performs special supplications whenever the country suffers from drought or deluge. The southern city is not subject to the same strict military rule as the northern, and is in consequence resorted to by many persons in quest of relaxation and dissipation. During the night the great thoroughfares are usually quiet, and are dimly lighted by lanterns which hang from the doors of the houses. The air is polluted by the stench arising from private vessels and public reservoirs for urine and all kinds of offal, which is carefully collected and carried out of the gates in the same boxed carts in which the vegetables are brought to market. Carriages (or rather covered carts without springs drawn by mules), saddle horses, and donkeys are used for locomotion, and can be hired at numerous stands throughout the city; but sedans are not permitted to be used so near the emperor except by privileged persons. The Mantchoo women ride astride, and their number in the streets, both riding and walking, imparts a peculiarity to the crowd which is not seen in cities further S. The various tribes of central Asia have representatives among the throng, and their different costumes add to the liveliness of the scene.—The climate of Peking is excessively cold in winter. The thermometer ranges from 10° to 25° in winter, and in summer it sometimes rises to 105°, but is generally between 75° and 90°. Water is frozen from December to March, and violent storms and whirlwinds occur in spring. But upon the whole the climate is healthy, and epidemics are rare.—The manufactures of Peking are trifling, and the trade of the place is confined to supplying the wants of the inhabitants. The principal part of the provisions consumed comes from the S. provinces, or from the N.

part of Chi-li, the plain adjoining the city producing but little. The taxes of China are for the most part paid in kind, and large quantities of grain are stored in the principal granaries of Peking at one season of the year; but the supply becomes exhausted before the next harvest is reaped, and when this happens many of the people die of famine. Coal is brought from the S. and S. W. upon the backs of camels and mules; and the houses are heated by stoves, the fuel being a compound of coal dust and earth. All the necessaries of life are exceedingly dear, and many of the inhabitants are miserably poor.—The government differs from that of other cities in the empire; it is separated from the affairs of the department, and administered by officers residing in the 4 circuits into which it is divided. A minister of one of the boards is appointed superintendent of the city, and subordinate to him is a mayor. These functionaries are quite independent of the provincial governor, carrying any affairs which they cannot determine directly to the emperor. The police is materially assisted in its duties by the gates which are placed at the heads of the streets and closed at night, and watchmen patrol the city, marking the time by striking two pieces of bamboo together. There is frequently much trouble in keeping the populace quiet, for in times of unusual scarcity they rise in mobs and pillage the public granaries. There is a government journal called the "Peking Gazette" published daily in the form of a pamphlet, which contains from 60 to 70 pages. Nothing is printed in it without first being examined by a political or literary committee, and the official part emanates from the emperor's cabinet. It notices all public affairs, and gives a succinct account of the principal events. It contains the petitions and memorials presented to the emperor, together with his replies and his orders and instructions to the mandarins. Records of judicial events conclude the official part, which the editors cannot change or alter in any respect, without subjecting themselves to the penalty of death. Examples of this punishment, occurring from time to time, maintain among the public an almost religious respect for all that appears in the "Gazette." The journal is regarded as an expression of the emperor's will, which every one obeys, and before which every one bows.—The environs are occupied with groves, private mansions, hamlets, and cultivated fields, in or near which are trees, so that the city viewed from a distance appears as if situated in a forest. The park of Yuen-ming-yuen, or "round and splendid gardens," so celebrated in the history of the foreign embassies to Peking, lies about 8 m. N. W. from the city, and is estimated to contain 12 sq. m. The country becomes hilly in this direction, and advantage has been taken of the natural surface in the arrangement of the different parts of the ground, so that the whole presents every variety of hill and dale, woodlands and lawns, interspersed with canals, pools, rivulets, and lakes, the banks of which have been thrown up or diversified in imitation of nature. Some parts are cultivated, groves and tangled thickets occur here and there, and places are purposely left wild in order to contrast the better with the highly cultivated precincts of a palace, or to form a rural pathway to a retired summer house. The number of residences for the emperor or his ministers within this park is estimated at 30, each of which is surrounded by many houses occupied by eunuchs and servants. The summer palace and principal hall of audience, the most extensive and by far the most splendid of these residences, was plundered by the French and English forces in their advance upon Peking, in Oct. 1860. The entrance or reception hall was 110 feet long, 42 feet wide, and 20 feet high. It was paved with marble, and painted with gold, azure, and scarlet, in the most gorgeous style. The throne of the emperor was made of a dark wood beautifully carved, and the cushions were embroidered with golden dragons. The inner chambers and saloon were handsomely fitted up. The rolls of silk, satin, and crape, all of the best quality, not only furnished turbans and bedclothes for the French soldiers, but were used to wrap around fowls, old pots, and other vulgar booty. The jade stone and china were of great value, and some Sèvres china of Louis Quatorze was found; and a presentation sword with the English coat of arms, studded with gems, and evidently of antiquity, gave rise to a good deal of speculation. The English treaty of Tien-tsin was also discovered, and an immense quantity of plunder of all kinds made it difficult to decide what to take away. The emperor had retired the day before, and all the ladies had disappeared, but their little Japanese dogs were running about in a distracted state. In the treasury there was about $61,000 in gold and silver. The total value of the property carried off and destroyed amounted to several millions. Among the most curious discoveries made were a suit of magnificent armor, inlaid with gold, and the helmet surmounted with an enormous pearl; a saloon furnished in exact imitation of the style of Louis XV., decorated with the portraits of the ladies of the court of that monarch, and the name of each lady inscribed at the bottom of the frame; and among the porcelain were some immense vases which had passed more than a century at the bottom of the sea, and to which marine vegetation had clung in such a manner as to produce the most singular ornaments. Some valuable books and papers were secured for the British museum, and the coat of armor was reserved for the emperor of the French. In revenge for the cruelty with which some French and English prisoners had been massacred, this palace was burned to the ground.—Though Peking is regarded by the Chinese as one of their most ancient cities, it was not made the capital of the country until the conquest by the Mongols, when Kublai Khan, about 1262, established his court first at this spot, then called Shuntien Foo. He afterward removed it to Hang-chow. The native emperors who succeeded the Mongols held their court at Nanking, until the 3d prince of the Ming dynasty transferred the seat of government to Peking in 1411, where it has ever since remained. Under the Mongols the city was called Khan-palik, or city of the khan, and on the Chinese maps it is usually called King-sze, or capital of the court. It was at first surrounded by a single wall pierced by 9 gates, whence it is sometimes called the city of nine gates; but since then the S. suburbs have been enclosed. The N. portion was taken possession of by the Mantchoos in 1644 for barracks and residences. The government purchased the buildings from the Chinese and gave them to their officers; but necessity soon obliged these men, less frugal and thrifty than the natives, to sell them and content themselves with humbler abodes; consequently a great part of the Tartar city is now tenanted by Chinese. In the latter half of the 17th century the city was destroyed by an earthquake, and 400,000 persons are said to have perished. The Portuguese sent an embassy to Peking in 1517, but the emperor refused to receive it and the ambassadors were sent to Canton. They were imprisoned there till 1523, when they were put to death. A second embassy was sent from Goa in 1552, but proceeded no further than Malacca; and a third despatched from the same place in 1667 had not a satisfactory result. In 1723 another envoy was sent, who arrived at Peking in May, 1727, and had his audience of leave in July, receiving some gifts in exchange for the 30 chests of presents which he brought from the king of Portugal. No more advantage resulted from this than from any of the previous embassies. Another, and the last that the Portuguese sent, reached Peking in 1750, and ended much the same as the others. A Spanish envoy who came out in 1580 was imprisoned, and only released through the intervention of the governor of Macao. A Dutch embassy in 1656 reached Peking, but was not successful; and a second in 1794 was treated with contempt. The Russians have sent several embassies to Peking, and from their frontier being in contact with China have compelled the Chinese to treat them as equals. Their first recorded visit was in 1619, but it is doubtful whether it can be properly styled an embassy. In 1689 the boundary line of the two empires was fixed by treaty, and the following year the ratification was exchanged at Peking. The next mission was sent by Peter the Great in 1719, and the evident importance of keeping on good terms with the Russians led the Chinese to treat their envoys with unusual respect, and attend to the business which they came to settle. In 1727 another embassy succeeded in placing the intercourse between the two nations on a still better basis; and a mission was established at Peking, consisting of 6 ecclesiastical and 4 lay members, to study the Chinese and Mantchoo languages, so that interpreters could be prepared and communications carried on more satisfactorily; the members of this college are changed decennially. The intercourse of the English with China, though it commenced later than that of most of the other maritime nations of Europe, has been far more important in its results. Their commercial transactions with the Chinese became so complicated toward the close of the last century, that it was determined to send an embassy to the court of China to place their affairs on a better footing. In 1792 Lord Macartney was despatched with a large suite, and presents for the emperor, which it is supposed were looked upon as valuable tribute. Though the embassy failed in its most important points, it nevertheless produced some good effects, and for many years the trade went on without interruption. Further difficulties arising between the English and Chinese, a second embassy was sent under Lord Amherst, arriving at Peking in Aug. 1816. This mission was summarily dismissed without an audience, because the ambassador would not perform *kotow*, or appear before his majesty the day he arrived. A letter was sent from the emperor to the prince regent, in which among other things it was said: "I have sent thine ambassador back to his own country without punishing him for the high crime that he has committed." The intercourse of foreigners was for many years after this in a very unsatisfactory condition. On June 13, 1858, Count Putiatine, the Russian ambassador, signed a treaty in which the chief points conceded by the Chinese were the right of correspondence upon an equal footing between the Russian minister of foreign affairs and the first minister of state at Peking; permission to send diplomatic agents to that city upon special occasions; liberty of circulation throughout the empire for missionaries under a system of passports; and the right to trade at ports then open, and in addition at Swatow, at a port in Formosa, and another in Hainan. On the 18th of the same month the American treaty was signed by Mr. Reed, in which the same privileges were accorded to the government of the United States, and a clause added conferring all privileges that might in future be granted to "the most favored nation." A few days afterward the English and French treaties were signed, respectively by Lord Elgin and Baron Gros at Tien-tsin. In due course the ratified copies of the American and Russian treaties were exchanged at Peking; but a dispute arising between the ambassadors of other powers and the Chinese with regard to the route by which they should proceed to the capital, they were forced to retire. Early in Oct. 1860, an English and French force upward of 25,000 strong, after destroying the summer palace and devastating several cities, quietly encamped within the earthwork about a mile outside the N. wall of Peking. The emperor had escaped to an ancient palace beyond the great wall, and had left his brother, Prince Kung, who was authorized to treat as plenipotentiary with the invaders. The prince showed great reluctance in complying with some of the demands made by Lord Elgin and Baron Gros, and only yielded when assured that Peking would be utterly destroyed in case of his refusal. One of the city gates was placed in the hands of the French and another in those of the English; and every thing was done that appeared likely to humble the minister and mortify the pride of the Chinese emperor. On Oct. 24, the day appointed by Lord Elgin for exchanging the ratifications of the treaty of Tien-tsin, and signing the convention of Peking, the streets leading to the prohibited city were occupied and the audience hall within its limits where the ceremony took place surrounded by British troops. Lord Elgin passed through the streets with a numerous escort, and entered the audience hall with his suite, bowing coldly to Prince Kung, who approached with the usual salutation of respectful greeting, and appropriating to himself the most honorable seat, placing Sir Hope Grant, the commander-in-chief, in a chair on his left. On the following day the same ceremonies were performed between the French and Chinese plenipotentiaries. The substance of the treaty was as follows: 1, the emperor of China expressed regret at the misunderstanding occasioned by the affair at the Taku forts; 2, the right of the queen of Great Britain to keep a resident minister at Peking was acknowledged; 3, £3,100,000 was to be paid by the Chinese government as indemnity; 4, Tien-tsin was opened to trade; 5, the interdict upon the emigration of Chinese to the British colonies was removed; 6, a portion of the mainland opposite Hong Kong, called Cowloon, was ceded to the British; 7, the immediate operation of the treaty and convention was provided for. The French also received a large indemnity, and Tien-tsin was to be occupied by the allies till their claims were satisfied. Though this was the first formal embassy sent by the French to Peking, they have by their missionaries made the rest of the world better acquainted with China, and given the Chinese more knowledge of western countries, than all other Christian nations together.

PELAGIUS, the founder of a religious system in the 5th century. Little is known of his life. He was a British monk named Morgan (signifying sea-born), of which Pelagius is a translation, and by the incursions of barbarians was driven from his native land. He went first to Rome (409), where he made the acquaintance of Cœlestius, and the two afterward (411) went to Carthage. Pelagius soon left Africa for Palestine, but Cœlestius, who endeavored to be received among the presbyters of Carthage, was accused of heresy before a synod held at that place in 412 and condemned. The doctrines on the ground of which he was declared guilty of heresy, are the following: 1, Adam was created mortal, so that he would have died whether he had sinned or not; 2, Adam's sin injured only himself, and not the human race; 3, new-born infants are in the same condition in which Adam was before the fall; 4, the whole human race neither dies in consequence of Adam's death or trangression, nor rises from the dead in consequence of Christ's resurrection; 5, infants obtain eternal life, though they be not baptized; 6, the law is as good a means of salvation as the gospel; 7, there were some men, even before the appearance of Christ, who did not commit sin. These 7 propositions (others count only 6, leaving out the 5th, or joining it to one of the other propositions) were and still are regarded as the cardinal points of the Pelagian system, although it is difficult to decide how far Pelagius accorded with all of them, since he expressed himself very cautiously. In consequence of the condemnation of Cœlestius, Pelagius himself was soon attacked in Palestine, where Jerome became one of his most zealous opponents. Jerome, conjointly with Orosius, a disciple of Augustine, accused Pelagius at a synod held at Jerusalem in 415, under John, bishop of that city. John, however, did not pronounce his condemnation, but referred the whole matter to the see of Rome, then occupied by Innocent I. At another synod of 15 bishops, held in the same year at Diospolis, under Eulogius of Cæsarea, Pelagius was acquitted. The churches of Africa, on the other hand, reiterated their rejection of the system in a synod of 69 bishops held at Carthage, and in a synod of 61 Numidian bishops at Mileum, both held in 416. Both synods urged Innocent to pronounce on this subject, as did also, in a private letter, Augustine, who now entered the arena as the most powerful opponent of Pelagianism. The reply of Innocent was to the satisfaction of the African bishops, and Pelagius deemed it necessary to address to him an explanatory apology of his system, which, however, did not reach Rome until after the death of Innocent. His successor, Zosimus, was induced by the confession of faith that Cœlestius, who was now in Rome, had drawn up, and also by the letters and protestations of Pelagius, to declare the two accused sound in faith, and unjustly persecuted by their adversaries. The African bishops, 214 in number, met again in a synod at Carthage, and stood by their former decision; and Augustine appealed to the emperor Honorius (418), who issued a rescript to the prefect, ordering the immediate suppression of the new heresy. Another council at Carthage, which was attended by delegates from all the provinces of Africa and even from Spain, specified and solemnly condemned as heretical 9 doctrines of Pelagius. Similar declarations were issued by the bishops Theodotus of Antioch and Praylius of Jerusalem; and Zosimus now also lost confidence in the new teachers, and published his *Epistola Tractoria*, in which the Pelagian doctrine is condemned. All the bishops of the western churches were called upon to subscribe to this epistle; many yielded, but Julian, bishop of Eclanum in Apulia, the most gifted of all Pelagian theologians, undertook the defence of the system, though without success. He had to sacrifice his office, and to repair with Pelagius and Cœlestius to Asia, where some more fruitless efforts were made to gain influential bishops, as Theodore of Mopsuestia and Nestorius of Constantinople, over to their cause. Little is known of the farther history of Pelagius, his two friends, and their doctrines, except that the last were again condemned as heretical by the œcumenical council of Ephesus in 431. The followers of Pelagius never formed a sect properly so called; but Pelagianism, as a theological system, though condemned, retained its adherents. The best works on the history of Pelagianism are: Wiggers, *Versuch einer pragmatischen Darstellung des Augustinianismus und Pelagianismus* (2 vols., Berlin, 1821–'3; English translation by Prof. Emerson, New York, 1840); Jacobi, *Die Lehre des Pelagius* (Leipsic, 1842).

PELARGONIUM. See GERANIUM.

PELASGIANS (Gr. Πελασγοί), an ancient people, who in pre-historic times occupied the Grecian peninsula, the islands and coasts of the *Ægean*, and portions of Asia Minor and Italy. Our knowledge about them is very vague and contradictory. The term is sometimes used in a broad sense to include the great ethnological family who were the earliest inhabitants of Greece and Italy, and sometimes in a narrower sense to mean only a single tribe or nation of that family. The most ancient writers give the name a wide rather than a narrow meaning. Homer, who was the first to mention them, connects them at once with Crete, Dodona, and Thessaly. Æschylus makes Pelasgus, the king from whom the race derived its name, a ruler over the whole of Greece; while Herodotus says that Greece was called Pelasgia, and includes under the common name of Pelasgians the Athenians, the Arcadians, the Ionians of Asia Minor, the Lemnians, the Samothracians, and the Crestonians. On the other hand, Thucydides, whose authority is of the highest weight, states that the Pelasgians were only the most numerous of the many kindred races which inhabited Greece. They came from the East at a very early period, passing over from Asia Minor, where they had built the two cities which bore the name of Magnesia, to the islands and the mainland of Greece, and establishing themselves principally in Thessaly, Epirus, and Peloponnesus. The Arcadians, Ionians, and Argives seem to have been Pelasgian races. Attica was Pelasgic at a very remote period, and the earliest population of Macedonia may have been of the same stock. In Italy the southern nations, such as the Peucetians, Daunians, and Japygians were of Pelasgic race; and there is reason to suspect that the same element entered largely into the composition of the Latin people. At one time the population of Etruria was also Pelasgian to a very great extent. At the beginning of authentic history the Pelasgians of Asia were a declining race, holding only a few scattered posts, "the last strongholds," says Rawlinson, "of a people forced everywhere to yield to conquerors. The natural explanation of the historical phenomena is that the Pelasgi were the original population of western Asia, and that their emigrations across the sea into Europe were occasioned by the pressure upon them of immigrants from the east, Lydians, Phrygians, and Carians, who forced them westward, and so caused their occupation of Greece and Italy." The Pelasgians of Europe were celebrated for their wanderings, to which they were apparently compelled by the encroachments of stronger races who drove them from country to country. Their leading characteristics seem to have been peaceful habits, agricultural pursuits, a love of navigation, and a natural taste for art. They were skilled in fortification, and in every land which they once inhabited their presence can still be traced by numerous works of defence, built of immense polygonal blocks of stone fitted together without mortar or cement, and of such substantial strength that they have outlasted the structures of succeeding ages and races. These works are commonly known as Cyclopean, a name given to them for their grandeur and antiquity. The ultimate fate of the Pelasgians is wrapped in mystery. They disappeared a few centuries before Christ, probably absorbed by other races more or less akin to them. In Greece proper they mingled with the Hellenes, and in Asia Minor with the Carians, the Lydians, and the Phrygians; while in Italy they were either reduced to the condition of serfs or united with their conquerors to form a new people, the Latins. "Their whole character," says Rawlinson, "was plastic and yielding, not firm nor formative; and their fate was to furnish a substratum upon which stronger nationalities established and developed themselves."

PELEW ISLANDS, a chain of islands in the N. Pacific ocean, forming part and situated at the W. extremity of the Caroline archipelago, between lat. 7° and 8° 30' N., and long. 134° and 136° E. The group consists of about 20 principal islands, nearly encircled by a coral reef, and covers an extent of about 120 by 20 m. Babelthouap, the largest of the islands, is about 28 m. long and 14 broad, and contains a mountain so high that the whole group may be seen from its summit. When seen from the sea the islands appear rugged and mountainous; but the soil is rich and fertile, and the whole are watered by several brooks and ponds. They are well wooded, and produce breadfruit, cocoanuts, bananas, sugar cane, yams, lemons, and oranges, beside numerous other tropical fruits and vegetables. Horned cattle, pigs, goats, and fowl are numerous; and turtles, fish, and shell fish abound on the coasts. The inhabitants are of the Malay race. They pay great attention to the cultivation of their ground, and show considerable ingenuity in making their canoes, some of which can carry 80 men. The men go entirely naked, and the women almost so.—The Pelew islands are said to have been discovered by the Spaniards in 1545, and they were afterward seen several times by ships bound to China by the E. passage; but they were first brought to the notice of the civilized world by the loss of the British ship Antelope, Capt. Wilson, in 1783. The natives treated the crew of the wrecked ship with the greatest kindness. Capt. Wilson took the son of the chief to England, where he was placed at school and displayed considerable aptitude for civilized customs and an excellent disposition; but he died of small pox, at the age of 20, the following year. Several other narratives of voyagers give an equally favorable account of the islanders; but it would appear that a more extended acquaintance with the white man has made them treacherous. The Siren, whaler, when passing the S. island in 1823, was boarded by 100 men who appeared to be friendly, but when opportunity offered attacked the crew, and were only repulsed after a desperate fight, in which most of the ship's company, 37 in number, were wounded and 2 officers killed. Since then several vessels have had very narrow escapes from being cut off while visiting the islands.

PELICAN, a genus of large, web-footed birds (*pelecanus*, Linn.). The bill is very long, nearly straight, and much depressed; the upper mandible has an elevated ridge, becoming flat toward the end, the tip being strong, hooked, and acute; the lower mandible is wider at the base than the upper, and its branches are united only at the tip; the nostrils are scarcely perceptible, in the lateral groove at the base; the wings are moderate, the 2d quill the longest, and the secondaries nearly as long as the primaries; the tail is broad, short, and rounded; the tarsi short and stout, covered with reticulated scales; all four of the toes on the same plane, the hind one turned more or less inward, and all connected by broad webs, the middle toe the longest. The head is moderate and crested, the neck long and slender, and the feet toward the middle of the body; under the lower jaw, and extending to the throat, is a loose, naked membranous pouch capable of great distention, which is used as a scoop-net for fish; around the eyes and base of the bill are bare spaces. The skeleton is remarkable for the great extent of its air cavities, the bones weighing less than 2 lbs.; from these the air penetrates into the areolar tissue under the skin, making the body for its bulk exceedingly light; the œsophagus is very capacious and the stomach small. The species are not numerous, but are found in most parts of the world, and most abundantly in tropical regions, frequenting both the sea coast and interior lakes and rivers; they are very voracious, feeding entirely on fishes, and the pouch is capacious enough to hold fish sufficient for the dinner of half a dozen men; they are good swimmers, divers, and fliers, and can perch easily on trees. In the morning and evening they leave their roosting places in flocks of about a dozen, and fly to their fishing grounds; they fish until satisfied, swallowing their prey on the spot, and retiring with a full crop to some solitary place to digest it; they often doze on the water during the progress of digestion. They fly sometimes elevated, and at others skim near the surface, and, balancing themselves when they see a fish, fall headlong upon it with the apparent risk of breaking their necks.—The white pelican (*P. onocrotalus*, Linn.), the *onocrotalus* of Pliny but not of the Greeks, is between 5 and 6 feet long, and 12 to 13 in expanse of wings; the general color is white, with rosy tinges, and the primaries are black; the upper mandible is bluish with red and yellow tints, and the hook on the end is bright red; the pouch is yellow. It is found in S. E. Europe, Asia, and Africa, sometimes coming as far W. as Germany, but not to Great Britain. The nest is generally made in a rude manner on inaccessible rocks, near fresh or salt water, and the eggs are 2 to 4; it builds sometimes on trees remote from water; the young are fed by the regurgitated food of the parents; this operation is rendered easier by pressing the pouch and lower mandible against the breast, and the contrast of the red hook of the bill against the white of the breast probably gave rise to the poetic idea of the ancients that the female pelican nourished her young with her blood. It is a very long-lived bird; in captivity it will eat rats and small mammals as well as fish; its flesh was forbidden to the Jews, and few would care to eat it, as it is very rank, fishy, and oily; it is said to have been tamed and employed in fishing, like the cormorant among the Chinese. Its pouch has been used to make caps and bonnets and tobacco bags; the Siamese make of it strings for musical instruments, and the Nile and other boatmen use it with the lower jaw attached for baling water from their canoes; it will hold in the living bird 10 to 12 quarts of water, and hence the pelican is called "river camel" by the Egyptians. A variety or species (*P. crispus*, Bruch.) in S. E. Europe is somewhat larger, of a more grayish white, with curled feathers on the back and sides of the head; these collect in flocks, and extending their line in the form of a crescent, by flapping their wings and plunging into the water, drive a shoal of fish into a small and shallow space, and there speedily obtain a full supply.—The American white or rough-billed pelican (*P. trachyrhynchus*, Lath.; genus *cyrtopelecanus*, Reich.) is about 6 feet long, with an alar extent of between 8 and 9 feet, and a weight of 17 or 18 lbs. It much resembles the *P. onocrotalus*, being of a general white color, tinged with roseous in the breeding season; the primaries are black, and the iris white; the head and neck are covered with slender, small, and downy feathers, elongated into a crest on the nape and running down the back of the neck; on the body generally the feathers are narrow and long; the crest is yellow, the eyes very bright, and in spring the legs, feet, bill, and pouch are orange red, fading to yellowish in the autumn. The bill is 14 inches long, and the sac beside this length extends 8 inches on the throat, being 7 inches deep at the widest part; the wings are long, narrow, and rounded, and the primaries much curved; the tail consists of 24 feathers; the horny and fibrous ridge on the upper mandible of the males increases with age, and is used as a means of defence in their battles during the love season; the females are rather smaller than the males. Abundant during the winter in Florida, it is found in summer in the interior of the fur countries as far as lat. 61° N.; it does not occur on the coast of the middle and northern states, as the course of migration is along the great inland rivers. They do not dive for their prey either from the wing or the surface of the water, but thrust the head under as far as the neck will allow, feeding mostly in shallow places, as they swim along against wind and current with the wings partially extended and the upper mandible only of the bill appearing above the surface; they are sometimes seen in company with the brown species, next described; occasionally they drive fish in shallows, where they can easily scoop them up with the pouch. As they stand upon the sand bars, they have a sedate and grave look, and a very ludicrous habit of gaping or opening their long mandibles; they are rather stupid, and not very shy; inactive during most of the day, they fish in early morning and evening; the gait is very awkward; they are said to be very tenacious of life. They destroy a great number of small fish; several hundred minnows have been taken from the stomach and œsophagus of a single individual; when approached after a full meal they disgorge their food like the vultures; the flesh is rank and fishy, and unfit for food. The sac is expanded by the opening of the bill, and *vice versa*. They breed in the fur countries, but not generally in the south like the next species; they are found in the Rocky mountains and in California.—The brown pelican (*P. fuscus*, Linn.; genus *onocrotalus*, Wagler) differs from the last species in habits, size, and colors; it is a smaller bird, being only about 56 inches long, with an extent of wings of 7 feet and a weight of 7 or 8 lbs. The bill is 13½ inches long, grayish white, tinged with dusky and with spots of carmine; there is no ridge on the upper mandible; the orbital space is blue, the crest light chestnut red, and the tail has only 22 feathers. The head and sides of the neck are white; the hair-like feathers of the forehead yellow; the neck behind and in front below dark chestnut brown; back, wings, and tail grayish ash, margined with dusky, the last with the shafts white at the base and black at the end; primaries brownish black; below dark brownish ash, with narrow longitudinal white lines on the sides; iris white; legs and feet black. The female is like the male, but the feathers of the head are more rigid; the young are dusky brown. It is found from North Carolina to Texas, and on the coast of California; it is a constant resident in Florida, and is now rare N. of St. Augustine; it goes south far beyond the limits of the United States; it is not seen on fresh water beyond the reach of the tide, like the white pelican. The flight, though apparently heavy, is well sustained, performed by alternate easy flappings and sailings, and in long undulating lines; in calm weather they perform intricate aërial evolutions at a great height; during flight the head is drawn between the shoulders and the feet extended. They are always awake during the coming in of the tide, which is the favorable time for fishing; they are never seen far from shore when a storm is threatening, and their appearance at sea is regarded by sailors as a sure sign of pleasant weather. They procure their food on the wing, plunging from a height of 15 to 25 feet, with the lower mandible wide open and the pouch extended, scooping up the fish and swallowing them at once; their plunge is very singular, and seems to the spectator calculated to break the neck; giving no indication of being about to plunge, as diving birds usually do, they fall suddenly as if from apoplexy, striking the water with great force and splashing it about so that it is impossible to determine whether the whole body is immersed or not. They do not carry fish or water to their young in the pouch, as has been generally believed, and, according to Audubon, this part is always contracted during flight. It is not uncommon to see these birds with a hole through the pouch caused by the spine of a fish, and their throats are occasionally reddened by the blood which has flowed from such a wound. They are fond of following porpoises, picking up their share of the terrified fish on which these cetaceans feed; and in their turn they involuntarily provide for the black-headed gull (*larus atricilla*, Linn.), which watches their plunges, and as they emerge alights on their head or bill, seizing any small fry which may protrude beyond the bill or pouch; the pelicans do not seem to notice the thefts or clamor of the gulls, and make no attempts to dislodge or drive them away; this is certainly a very curious instance of animal instinct and fraternization. They are awkward walkers, but buoyant swimmers; when wounded they will bite severely; they feed on fish generally 2 or 3 inches long, rarely taking one as long as the bill; they are powerful birds, but very sensitive to cold; the flesh is tough and unfit for food, and the eggs are not much better; the senses of sight and hearing are very acute;

they are among the most silent of birds. They always keep in flocks of from 20 to 60, and begin to pair by the middle of April; the nest is made of sticks, lined with leaves and grasses, and placed high on a mangrove tree; many nests are built in the same tree, and the trees are often near together; they breed in company with the egrets, herons, and spoonbills, and on islands frequented also by white ibises and frigate pelicans; if not disturbed they use the same breeding places year after year. The eggs, 3 in number, 3¼ by 2¼ inches, are thick-shelled and rough, white, more or less tinged with blood. The young are at first fed by regurgitation of the food of the parents, and so abundantly that the refuse fills the air with the most disgusting odor; they grow fast, and are very fat; they are highly prized as food by the Indians and negroes, and form a *bonne bouche* for many a vulture.

PELIDES. See ACHILLES.

PELIGNI, an ancient people of central Italy, of Sabine origin, who dwelt between the Marrucini, the Marsi, Samnium, and the Frentani. They were renowned as warlike, like the Marsi reputed as magicians, and long warred against the Romans, but together with their neighbors concluded a peace with the republic about the end of the 4th century B. C. They played a principal part in the social war, one of their chief towns, Corfinium, near the Aternus, being selected by the allies as the future capital of Italy, and therefore surnamed Italica. They were finally subdued in 89 B. C., by C. Pompeius Strabo, the father of Pompey the Great.

PELION (now *Zagora*), in ancient geography, a mountain range of Thessaly, extending along the coast of Magnesia, and forming the promontories of Sepias and Æantium. On the N. it is connected by a low ridge with Mt. Ossa. On its summit there was a temple of Jupiter Actæus, and near this was fabled to be the cave of the centaur Chiron. Its magnificent forests, for which it is still distinguished, furnished the timber for the ship Argo, and the shaft of the celebrated spear of Achilles. In their war with the gods, the giants are said to have attempted to scale heaven by piling Pelion and Ossa on Olympus, or Ossa and Olympus on Pelion. The name Plessidhi is now applied to the N. W. summit of Pelion.

PÉLISSIER, AMABLE JEAN JACQUES, duke of Malakoff, a marshal of France, born at Maromme, near Rouen, Nov. 6, 1794. He studied at the military schools of La Flèche and St. Cyr, and became a sub-lieutenant of artillery two days before the return of Napoleon from Elba. He served in Spain in 1823, became a captain in 1828, served in Greece, and in 1830 took part in the expedition against Algeria. In 1832 he returned to France in ill health, but in 1839 he went back to Algeria as a lieutenant-colonel, and remained there more than 16 years. In July, 1843, he was made colonel, and commanded the left wing of the army in the battle of Isly. During the insurrection of the Kabyles in 1845 he entered the territory of the Ouled Riahs, an Arab tribe who took refuge in one of the spacious caverns in which their country abounds. Into these fastnesses they were accustomed to retire, and from the inability of an enemy to penetrate them, the tribes had begun to consider themselves invincible. To all summonses to surrender they refused to listen, and even prevented the approach of messengers by the discharge of firearms, although aware that death would be the consequence of their unwillingness to comply with the terms offered. After 28 hours spent in fruitless negotiations, Pélissier applied burning fagots to the mouth of the cave, and suffocated nearly 600 of the Arabs. The transaction excited great horror, as well in France as in other countries. Marshal Soult, then minister of war, condemned it formally, but Marshal Bugeaud declared that his subordinate had acted in accordance with his orders, and justified the operation as "a necessity of war." In 1846 Pélissier became brigadier-general, and in 1851 general of division. He remained in Algeria until Jan. 1855, when he was suddenly ordered to the Crimea as second in command to Gen. Canrobert; and when on May 19 Canrobert resigned he was appointed in his place, which he retained till the close of the war. Immediately after the fall of Sebastopol Pélissier was created marshal of France and duke of Malakoff, from the captured Russian fortification of that name, and was voted by the legislative body a pension of 100,000 francs. He replaced Count Persigny as minister to England in April, 1858, but was recalled in April of the following year in order to take command of the army of observation, the head-quarters of which was at Nancy. He has been made a member of the privy council, a vice-president of the senate, and in July, 1859, was appointed grand chancellor of the legion of honor. Queen Victoria has also conferred upon him the honorary grand cross of the order of the bath.

PELLERIN, JOSEPH, a French antiquary, born in Marly le Roi in 1684, died in Paris in 1782. He held a subordinate office in the navy department, and devoted the leisure hours of his long life to the collection of medals. He accumulated 32,500 specimens, which he finally sold to Louis XVI. for 300,000 francs. He previously had them engraved and published under the title of *Recueil de médailles des rois, peuples et villes* (10 vols. 4to., Paris, 1762–'78), with explanations and critical observations.

PELLEW, EDWARD. See EXMOUTH.

PELLICO, SILVIO, an Italian poet and patriot, born in Saluzzo, Piedmont, in 1789, died at the villa of Moncaglieri near Turin, Jan. 1, 1854. His father, who owned a silk manufactory at Pignerol, was a man of literary taste. About 1795 the family removed to Turin, and Silvio studied under a priest until he accompanied his sister, on her marriage, to Lyons. There he remained several years, gaining an intimate knowledge of the French language and literature, and a taste for French manners. His native land was almost forgotten, when the reading of Ugo Foscolo's poem, *I sepolcri*, which appeared in 1807, exercised a great influence over his studies and feelings; and in 1810 he returned to Italy, taking up his residence in Milan, where his father had obtained a situation under the government. There he became a teacher of French in the *collegio degli orfani militari*, and spent his leisure hours in acquiring the English and German languages and in poetical studies. Foscolo and Monti, then at Milan, welcomed him warmly; and soon afterward entering the family of Count Luigi Porro Lambertenghi as tutor, he became acquainted with many distinguished persons, among whom were Mme. de Staël, Schlegel, Byron, Hobhouse, Davy, and Brougham. His first production was the tragedy of *Laodamia*. It was followed by that of *Francesca da Rimini*, founded upon a passage in Dante's *Inferno*. This immediately excited considerable sensation, was acted in the principal theatres of Italy, and gave Pellico a high rank as a dramatic poet. His next work was a translation of Byron's "Manfred." In 1819, with some other literary men, he established a journal called *Il conciliatore*, and in this periodical his *Eufemia di Messina* and Manzoni's *Conte di Carmagnola* first appeared. Sismondi, Romagnosi, Gioja, and other prominent men of letters contributed to its columns. On account of its liberal tendencies it was early subjected to a rigid censorship by the Austrian authorities, and in 1820 it was entirely suppressed. About this time Pellico appears to have become a member of the revolutionary society of the carbonari. The insurrections which broke out both in Naples and Piedmont now gave the Austrians a pretext for severe proceedings in the case of suspected individuals, and on Oct. 13, 1820, Pellico was arrested. He was first confined in the prison of Santa Margherita at Milan, and thence was removed to a state prison on the island of San Michele near Venice, called "the Leads." Here he remained until his trial in Feb. 1822. He was condemned to death, but by an imperial rescript the sentence was commuted to 15 years of severe imprisonment (*carcere duro*). In April, 1822, he was taken to the prison of Spielberg near Brünn in Moravia, where, through the kindness of his gaoler, he was treated with comparative indulgence for about 18 months, being allowed to read the Bible, Homer in Greek, and several favorite Italian, German, and English authors. But the gaoler was removed, and from this time his treatment during the remaining years of his imprisonment was exceedingly rigorous. "Those condemned to *carcere duro*," says he, "are obliged to labor, to wear chains on their feet, to sleep on bare boards, and to eat the poorest food." In this manner Pellico dragged on a miserable life, until, when nearly at the point of death, he was freed by an imperial order on Aug. 1, 1830. He was taken to the Piedmontese frontier, and spent the rest of his life at Turin, acting as secretary to the marquis of Barolo. In 1832 he published an account of his 10 years' suffering, in a work entitled *Le mie prigioni* ("My Prisons"). This volume, which at once became widely celebrated on account of the intense interest of the story, and the simple pathos and unaffected piety pervading its pages, has been translated into English, 2 times into Spanish, 5 times into German, and 15 times into French. After his release he spent his life chiefly in literary pursuits. His "Works" were published in Padua in 2 vols. (1831); and at Turin, under the title of "Three New Tragedies," appeared in 1832 a volume containing his *Gismonda da Mendrisio*, *Leoniero da Dertona*, and *Erodiade*. The following year he published the tragedy of *Tommaso Moro*. In 1837 a collection of his "Inedited Works" appeared in 2 vols. One of his last productions was a religious treatise in prose, entitled "The Duties of Man." His life was written by Chiala in 1852.

PELOPIDAS, a Theban general and statesman, killed at the battle of Cynoscephalæ, in Thessaly, in 364 B. C. He was the son of Hippocles, a man of noble descent, and inherited great possessions, of which he made a liberal use. In a battle in which he was in imminent danger of losing his life, he was saved by Epaminondas at great risk; and from this time a friendship began between these two patriots, which lasted until the death of Pelopidas. His wealth and his devotion to public affairs made Pelopidas a prominent member of the popular party, so that, upon the seizure of the Cadmea by the Spartan general Phœbidas in 382 B. C., he with 300 others went into voluntary exile at Athens. There he remained 3 years, seeking an opportunity of overthrowing the Spartan rule in Thebes; and there finally was projected that enterprise which, according to Plutarch, was called by the Greeks "sister to that of Thrasybulus," and which restored democracy to Thebes. With 6 others he entered that city at nightfall, put to death the philo-Laconian polemarchs, slew Leontiades, the leader of the Spartan party, with his own hand, and gained possession of the citadel by the garrison's capitulating and consenting to withdraw. From that time until his death he was every year elected one of the Bœotarchs, and during the following year he bore a conspicuous part in the war against the Lacedæmonians. In 375, while returning from an attempt to surprise Orchomenus, he fell in at Tegyra with a Spartan force superior to his in numbers. When the messenger communicated the news, saying: "We have fallen into the midst of enemies," Pelopidas answered: "Why so, more than they into the midst of us?" and in the battle which followed was completely victorious. At Leuctra in 371 he coöperated with Epaminondas in inspiring resolution into his timid countrymen, and in the proposal of hazarding an immediate battle. In the engagement he commanded the sacred band, which led the charge against the enemy's right wing, and by defeating it decided the fate of the day. Afterward he seconded Epaminondas in persuading their colleagues in the army to march into the Spartan territory, although by so doing they would exceed their terms of office, an offence which according to law was punishable with death; yet on their return they were triumphantly acquitted. In 368 Pelopidas marched at the head of a Theban force to succor the inhabitants of Thessaly, oppressed by Alexander of Pheræ; he occupied Larissa, and compelled the tyrant to acknowledge his authority. Advancing into Macedonia, he composed the differences between Alexander II. and Ptolemy of Alorus, and took as hostages for their future good conduct 30 boys, among whom was Philip of Macedon. In 367 he was sent as an envoy to the Persian court at Susa, where, though he refused to make the customary prostration to the monarch, he obtained every thing for which he came, viz.: a rescript of the great king that Messene and Amphipolis should be autonomous cities; that Athens should order home all the ships in active service; and that Thebes should be deemed the head city of Greece, and any cities refusing to acknowledge her leadership should be threatened with compulsion by a Persian force. But this rescript was treated with contempt by most of the Grecian cities, and in performing a mission in Thessaly, in order to obtain its recognition, Pelopidas was treacherously seized as a prisoner by Alexander of Pheræ. A Theban force, in which Epaminondas served as a private soldier, was sent to rescue him, but failed in accomplishing its object in consequence of the alliance of the Athenians with the tyrant. A second expedition under the leadership of Epaminondas succeeded in releasing Pelopidas, who during his confinement is said to have treated Alexander with marked defiance. But the power of the tyrant of Pheræ was still predominant in Thessaly, and in consequence of repeated missions on the part of the inhabitants complaining of his cruelty, Pelopidas was despatched in 364 into that country at the head of an army. Although the portents were unfavorable, and his troops were terrified by an eclipse of the sun, he pressed on. Arriving at Pharsalus, he encountered Alexander at the head of a larger force than his own, and a contest immediately ensued as to which should gain possession of the hills called Cynoscephalæ. After a severe struggle, the tyrant was defeated; but Pelopidas, seeing Alexander himself, and burning with a desire to revenge his imprisonment, rushed to the spot where he was standing, attended by a few soldiers only, and was slain. His death caused great lamentation both among the Thebans and Thessalians, the latter asking and obtaining permission to take the chief part in his funeral. Pelopidas, though inferior to Epaminondas in military skill and mental power, was nevertheless one of the most prominent men Thebes ever produced; a devoted patriot, a disinterested friend, and so absorbed in his devotion to the public good, that he neglected all care of his private fortune, and to the remonstrances of his friends would reply that money was certainly useful to such as were lame and blind. His life was written by Plutarch, but the order of events given by him differs somewhat from that given above.

PELOPONNESIAN WAR. See GREECE.

PELOPONNESUS (Gr., "the island of Pelops," so called by the Greeks because King Pelops was supposed to have settled a colony there), a peninsula at the S. end of Greece, forming one of the great geographical divisions of that country, and now called the Morea; area, 7,779 sq. m.; pop. in 1856, 562,841. It lies between lat. 36° 23′ and 38° 20′ N., and long. 21° 5′ and 23° 30′ E., and is about 135 m. in length and the same in extreme breadth. The Greeks compared its shape to that of the leaf of a vine or a plane tree. The coast is much indented, on the S. by the gulfs of Laconia or Kolokythia and of Messenia or Coron, and on the E. by the gulf of Argolis or Nauplia. It is connected with central Greece by the isthmus of Corinth, which is 5 m. wide at the narrowest part, and separates the Corinthian from the Saronic gulf. The surface of the peninsula is generally mountainous. In the centre a long and lofty ridge bent into a circular form encloses an elevated basin, the famous vale of Arcadia, the largest of the ancient states. Five other ranges, running from the different sides of the central one to the 5 most prominent points on the coast of the peninsula, enclose plains or valleys which formerly were the seats of 5 states: Achaia in the N., Argolis in the E., Laconia and Messenia in the S., and Elis in the W. The mean height of the mountains is about 1,200 feet, but on the W. side they attain a height of from 3,000 to 4,500 feet. Mt. Cyllene, on the N. side of Arcadia, rises to the height of 7,788 feet; and Mt. Taygetus, the ridge which stretches southward from Arcadia to Cape Matapan (anc. *Tænarum*), is at the highest point about 8,000 feet above the sea. The principal rivers are the Alpheus, now called the Rouphia, which rises in Arcadia and flows W. through Elis into the Ionian sea; and the Eurotas, now the Vasilipotamo, which rises in the N. of Laconia and flows southward into the Laconian gulf. The climate is mild and the soil fruitful. The chief productions are corn, wine, oil, and fruits, honey, figs, silk, cotton, and the small raisins called currants, which are the principal article of export. At present the peninsula is divided into 5 nomes or provinces, viz.: Argolis and Corinth, the capital of which is Nauplia; Achaia and Elis, capital Patras; Arcadia, capital Tripolitza; Messenia, capital Kalamata; and Laconia, capital Sparta. Its ancient population has been computed at 2,000,000, which is probably an exaggeration, though it was certainly much more populous and flourishing than at present. It contains many ruins of famous ancient cities, among which those of Sparta, Mycenæ, and Mantinea are the most interesting.—About 80 years after the fall of Troy, Peloponnesus was conquered by the Dorians, led by the descendants of Hercules, who claimed possession of the country by ancestral right. This event is known in history as the return of the Heraclidæ. The Dorians established several states, one of which, Sparta or Laconia, became under the institutions of Lycurgus the most powerful in Greece. A combination of the Peloponnesian states against Athens in the latter part of the 5th century B. C. gave rise to the great contest known as the Peloponnesian war. In the decline of Greece in the 3d century B. C. a temporary importance was given to Peloponnesus by the Achæan league, to which a political organization was given by Aratus in 251, and which played a dominant part in the affairs of Greece till the conquest of the country by the Romans in 146. On the division of the Roman empire Peloponnesus became subject to the emperor of Constantinople; and on the decline of the eastern empire it was taken possession of by the Venetians, from whom the Turks conquered it in the middle of the 15th century. The Venetians regained it in 1699, but restored it to Turkey in 1715. During the Greek revolution of 1821–'8 it was the theatre of many interesting events, and the result of that struggle left it a portion of the present kingdom of Greece. (See Greece.)

PELOPS, in Grecian mythology, the son of Tantalus and grandson of Jupiter. His father, having invited the gods to a banquet, killed Pelops, and served up his remains at table. Ceres in a fit of abstraction ate a piece of the shoulder; but the rest of the immortals, perceiving what the dish was, ordered Mercury to restore the youth to life by putting the flesh in a caldron. Pelops was accordingly taken out alive, and in place of the part which Ceres had eaten received a shoulder of ivory, whence all his descendants, the Pelopidæ, were supposed to have one shoulder remarkably white. Afterward he applied to Œnomaus, king of Pisa, for the hand of his daughter Hippodamia; but the king, having been told by an oracle that his son-in-law would kill him, refused unless Pelops should conquer him in a chariot race, declaring however that he would take his life if he failed. Pelops bribed the king's charioteer Myrtilus to remove the linchpins of the royal chariot, and in the race Œnomaus was thrown out and killed. The victor then took Hippodamia to wife, assumed the government of Pisa, and soon made himself master of Olympia, where he restored the Olympic games with great splendor. He had promised Myrtilus half the kingdom, but after he had gained his object threw him into the sea. By Hippodamia he had 16 children, the two eldest of whom, Atreus and Thyestes, becoming jealous of Chrysippus, who was their father's son by Axioche or the nymph Danais, murdered him with the connivance of Hippodamia, and were expelled by Pelops from the kingdom. Their guilty mother fled to Argolis, where she died. Pelops was held in great veneration after his death, and a sanctuary was dedicated to him in the grove Altis at Olympia.

PEMBROKE, a seaport and county town of Pembrokeshire, Wales, situated on a creek of Milford Haven, 206 m. W. from London; pop. in 1851, 10,107. At the W. extremity of the rocky ridge on which the town stands are the ruins of an ancient fortress, erected in 1092. Pembroke dock is a government naval establishment situated about 2 m. N. W. from the town. The dock yard contains an area of 60 acres, and is enclosed by a lofty stone wall, inside of which are the public offices, &c. There are 12 building slips.

PEMBROKE, Earl of. See Herbert, William.

PEMBROKESHIRE, a county of Wales, occupying the extreme S. W. point of the principality, and bordering on the Bristol and Irish channels; area, 610 sq. m.; pop. in 1851, 94,140. The chief towns are Pembroke, Haverford West, St. Davids, Milford, and Tenby. Milford Haven is the chief port. The coast line is very irregular, being indented with numerous bays and studded with islands. The rivers are of little importance. The surface is generally undulating, with low hills and rich meadows and corn fields. The anthracite coal tract bisects the county. Copper ore is found, slate and coal are worked, and the fisheries are valuable. The county and its towns return 3 members to parliament.

PEMISCOT, a S. E. co. of Mo., in the extreme corner of the state, bounded E. by the Mississippi river; area, 600 sq. m.; pop. in 1860, 2,961, of whom 268 were slaves. Its surface is nearly level, much of it being covered by swamps, the largest of which, Lake Pemiscot, has an area of about 75 sq. m. It was formed in 1851 out of New Madrid co. Capital, Gayoso.

PEMMICAN, a preparation of preserved meat, made by cutting lean meat into thin strips, and, after they are thoroughly dried, reducing the substance to powder and mixing this with melted fat. It is largely used by the northern *voyageurs*, and constitutes an important item in the supplies furnished by the Hudson's bay company to their employees.

PEN, an instrument for writing with a fluid. Pens of some sort have been in use from very ancient times, adapted to the material upon which the written characters were to be impressed. Upon stone or metallic plates gravers of steel served for writing, and such are referred to by Job in speaking of an "iron pen." For the waxen tablets of the ancients a metallic stylus was employed, one end of which was sharpened for marking, and the other was flattened for erasing the marks and smoothing the wax. It was also the practice in ancient times, as among the Chinese at the present day, to paint the letters with a fine hair pencil. Pens of reeds also were made at a very early period for the use of a fluid ink upon papyrus. The reed selected for this purpose is described as small and hard, and about the size of a swan's quill. It was found in Egypt and Armenia; and Cairo and Alexandria were famous markets in which it was sold. Along the shores of the Persian gulf reeds are still collected for this use, and are distributed throughout various parts of the eastern countries, being better adapted to the ink and paper employed in these regions than any other kind of pens. They are prepared by leaving them under dung heaps for several months, which causes them to acquire a mixed black and yellow color, and a smooth and hard surface. The pith is dried up by the heat generated. The introduction of paper rendered necessary pens of finer character, and quills of the goose and swan next came into use, and for extremely fine writing those of other birds, as of the crow, were found well adapted. A great trade grew up in these articles, and continued for several centuries. Poland and Russia were largely engaged in it, and immense flocks of geese were raised in those countries chiefly for their quills. In a single year St. Petersburg has furnished to England over 27,000,000 quills. Germany and the Netherlands have also been large producers of goose quills. From each goose the average number of good quills obtained is only 10 or 12, though sometimes they have amounted to 20. As they are plucked from the wing they are soft and tough, and covered within and without with a thin membrane. They are first sorted according to the length and thickness of the barrel into primes, seconds, and pinions, and are then buried for a short time in hot sand, which dries the outside skin, so that it is easily scraped off, and the inner lining becomes shrivelled and detached. The process is repeated if necessary. This treatment is called, from having been practised in Holland, "dutching." After this the quills are hardened by dipping them into a boiling solution of alum or of diluted nitric acid, which also renders the barrel yellow. A portion of the barbs is then stripped off, and the quills are tied in bundles for the market.—The immense consumption of quills proved the necessity of more durable substitutes. In 1803 Mr. Wise of Great Britain produced pens of steel of barrel form, mounted in a bone case for carrying in the pocket. These were expensive and little used. Mr. Gillott of Birmingham commenced the manufacture about the year 1822, and introduced great improvements in the steel pen, making it of thinner and more elastic steel, and of higher finish and temper. Mr. Perry also was among the first large manufacturers of the article; and by their improvements the cost was so much reduced, that a gross of the pens, now made without the barrel, could be purchased for about the price of one of those made by Mr. Wise. Other makers succeeded, and a great variety of forms of pen were devised to give in the greatest perfection the required elasticity, and the capacity of holding a proper supply of ink, and of shedding it freely when pressed upon the paper. Most of these forms were more curious than useful, and the manufacture has since been chiefly limited to the simpler shapes, such particularly as resemble the form of the old pen cut from the goose quill. The trade centred in Birmingham, which supplies many countries in Europe, as also the principal demand for steel pens in the United States. The number of manufacturers in that city is reported to be 18, and 8 more are engaged in making pen holders. The processes are brought to such perfection, that better pens are now sold at 12 cents the gross than those which were produced in 1821 at a cost of $36 the gross. The prices vary from 4 cents the gross to 75 cents or $1. The total number made in Birmingham has been estimated at not less than 1,000,000,000 pens annually. In the United States several attempts have been made at different times to establish this manufacture; but it has been found almost hopeless to try to compete with the Birmingham manufacturers, and though large sums of money have been expended, the enterprises have generally been abandoned. In New York city a manufactory is in operation, called the Washington medallion pen factory, in which the processes are conducted upon the English plan. The steel sheets imported from Sheffield are, after annealing, cut into strips 3 feet long and 3 inches wide, then cleaned from the scale in dilute sulphuric acid, and rolled down to the required thickness. The ribbons of steel are then punched in a cutter by hand into blanks. These are next pierced by a punch in a hand screw with a hole near the point and where the slit will terminate. They are then annealed by leaving them 24 hours in a pot in the muffle of a furnace. After this they are stamped with their peculiar device, by means of a hammer worked by a treadle so rapidly that one girl may stamp 20 gross in an hour. The blanks, which are still flat pieces, are now shaped by being struck in dies; and after this they are hardened by heating and plunging them into oil. When the oil has partially drained off, they are further cleaned by alkaline washes, and rolling in a revolving drum with sawdust and sand. The tempering is effected by placing several thousand together in an iron cylinder which a boy keeps turning over a fire. By frequent trials it is ascertained when they have been sufficiently treated, and they are then taken out and spread to dry quickly. Another scouring in the revolving drum succeeds, and the color is thus transformed from bluish to nearly a clear white. The pens are next ground on the nib upon emery wheels by girls, who take each one up in a pair of pliers and perform this operation with singular rapidity and exactness, completing about 10 gross in an hour. This, called the "straight grinding," is distinguished from the "cross grinding," which is applied to the back of the pen as this is held in the hand, consuming almost double the time. The slits are next made by cutters working against each other in a screw press, and the roughness thus occasioned is removed by another polishing in the drum, after which the pens are browned or otherwise colored by heating them to the proper temperature in a revolving cylinder over a fire, and immersing them in a solution of lac. The last process is to examine them, reject the imperfect ones, and pack the good ones in small pasteboard boxes for the market.—The manufacture of pens of elastic material furnished with durable points of some extremely hard substance commenced in England with attempts to secure bits of metal to pens made of glass, tortoise shell, and horn. These beginnings led at last to the production of gold pens, the manufacture of which is carried to the highest perfection in New York, so that the only really excellent pen used in Europe is obtained from this country. In 1823 Mr. John Isaac Hawkins, an American by birth, residing in England, imbedded pieces of diamond and ruby in the points of tortoise shell pens, which were softened in water to receive the stones. The same manufacturer, hearing that bits of an extremely hard native alloy of iridium and osmium, sent by Dr. Wollaston to a penmaker to be used for points, had been returned as too hard for working, obtained these for his own experiments, and was the first to produce the famous "diamond points" soldered to gold pens. Mr. Mordan, a pencil case maker in London, also made some gold pens; but they were of little value, being deficient in elasticity. The manufacture of these pens made but slow progress, great skill, the result of long continued experiments, being necessary to produce the exact shape suited for the required elasticity of the pen, and to combine this with the proper size and form of the points. They were moreover costly as well on account of the metal employed as the labor expended in the manufacture. The right to make gold pens was purchased of Mr. Hawkins by Mr. Cleveland, an American clergyman then in England, who on his return induced Mr. Levi Brown, a watchmaker in Detroit, to undertake their manufacture. This was about the year 1835. The experiment was attended with little success. Mr. Brown removed in 1840 to New York, and there introduced the business, which gradually increased in importance as the quality of the pens was improved, and the price diminished by their more rapid production. At first the pens were cut with scissors into shape from a thin flat strip of gold, and a slit being cut in the nib a bit of iridium was soldered to each point separately, and the points were then rounded up into shape with a mallet upon a stick. The inferior pens thus made by hand sold for $5 to $10 each. The first machines, and almost the only important ones in use applicable to the different branches of this work, were invented by Mr. John Rendell, who was employed by Mr. Brown. He continued to make these machines of various forms and of extraordinary perfection from the year 1844, and furnished them to Mr. Bagley and Mr. Barney, who were well known as among the early makers of gold pens. To these inventions is chiefly due the excellence of the gold pens made in this country. Mr. Rendell systematized the process, giving to each workman his peculiar branch, and thus a nicety and certainty of good work were attained by each one which was essential to the perfection of the pen. The processes employed are more numerous and delicate than one not acquainted with the manufacture would readily imagine. In the factory of Mr. Leroy W. Fairchild in New York they are now conducted with the original machines of Mr. Rendell, and the improvements and additions to these made by Mr. Fairchild have materially contributed to the peculiar delicacy, elasticity, and finish of the perfect pen. In 1850 the business had grown to such importance in this establishment, that a steam engine was procured for running the machines, the first application of steam power to this purpose. The number of pens which such a factory may produce depends entirely upon the amount of care and labor spent on each one. Of the more common sorts 900 may be made in a day as readily as 500 in a week of the best. The following is a general description of the different operations in the order in which they follow each other. The alloy of gold and silver of 16 carats fine is melted, and when at the right temperature to produce the peculiar grain that indicates gold susceptible of the greatest elasticity, it is cast in hot ingot moulds in cakes of about 20 oz. each. These are then rolled out into sheets 10 or 12 feet in length and considerably thicker than the finished pens. The sheets are then taken to the stock cutters, and short blanks are punched out from them bearing some resemblance in shape to the pen. Each blank is then notched on the under side of the point by a little toothed wheel, against which the point is held as the pen rests in a seat made for the purpose in the machine. An iridium point, carefully selected with the aid of a microscope from the stock kept on hand (see IRIDIUM), is then laid in the notch; there are sometimes two such points, but generally only one, to each pen. A little borax is used to secure it in its place, while by the jet of a blowpipe the gold is softened around the point and the metals are welded together. The point is then applied to a copper emery wheel and brought to a square even face. The pen is then brightened up by a wash of nitric acid. In what are called the breakdown rolls, which are carried half round by a little lever held in the hand, the blanks are drawn out to the full length of the pen. The rolls take the pen by the point, and as this passes between them a spring set in the under one sinks into the roll, thus guarding the point against the pressure which is applied to the rest of the pen. The rolling is repeated in other rolls, called finishing rolls, of similar construction. This process leaves the pen with no particular elasticity; this is imparted to the lower end by a small planishing hammer worked by the hand, while the pen is held across a little anvil of curved surface. The next operation is to trim the pen, which is done in a finishing cutter, worked by a hand lever, similar to that in which the blanks are punched. This takes off a narrow strip round the margin except at the point. The name of the maker and size and number of the pen are now stamped on the back; and the pen is then ready to be "raised," or bent into the partially cylindrical form. To insure perfect shape and a permanent set to the new curve, it has been found necessary to employ a press of great power and dies of extreme exactness of figure; and this has perhaps proved the most difficult part of the whole process. The lever worked by the foot acts upon another with such increase of power, that the pressure obtained amounts to over three tons. From this the pen goes to the machine known as the "carriage cutting point," where it is nicely adjusted across a horizontal axis, which is then turned over, bringing the iridium point upon the edge of a thin copper emery wheel kept in rapid rotation. A slit is soon made through the iridium, dividing it into two points. In another lathe carrying a circular saw only half an inch in diameter, made of the finest steel and provided with very sharp teeth, the slit is extended up into the gold as far as is necessary. Burnishing the nibs, which succeeds, spreads the gold, partially filling the vacant space of the slit, and the proper elasticity is given to the lower part of the pen by hammering. The edges of the slit are next smoothed and trimmed by running into it the edge of a very thin wheel of tin fed with the finest emery. By the same operator the set is given to the nibs by bending them in with the fingers till they have each a uniform and precise curve. The pen being now held in a steel holder that leaves only the point projecting, this is applied to the surface of a revolving cylinder of copper fed with emery, and the iridium is chamfered on the back and ground on the under side into a somewhat hooked or beaked shape; the edges of the nibs are also smoothed and rounded. In another suitable holder the pen is placed to be honed or stoned on the back or convex side preparatory to polishing, and in still another the lower or concave side is exposed for the same purpose. Similar holders are used for the polishing, which is done on wheels covered with felt, and supplied with rotten stone. An application of lye is now made to remove the oil, and the pen is completed by roughening the concave surface of the nibs to prevent the ink flowing too freely. The finisher now takes the pen, readjusts the nibs, opens the slit again on the slitter, and smooths and polishes the points by delicately touching them to the polishing wheel. This work requires much skill and experience. Finally the head of the establishment submits each pen to thorough trial by writing with it, and otherwise proving its perfection. The pens are made chiefly of 9 sizes, ranging from $\frac{11}{12}$ of an inch to 2 inches in length, and the larger sizes in long nibs and short nibs. Some barrel pens also are made, the longest being about $2\frac{1}{4}$ inches long. In New York city there are 7 or 8 factories devoted to this manufacture, some of which produce however only cheap pens. In Brooklyn, N. Y., there is one factory; in Brooklyn, Conn., 2; in Haydensville, Mass., one: and in Cincinnati, one. In the last are made the pens of Dawson, Warren, and Hyde, which rank among the best in the market.—Pens have also been made of hardened gutta percha, and of caoutchouc similarly treated; but they have not proved of much service. The so called "Protean fountain pen" contains a supply of ink in its hollow handle, and the tube which holds it extends nearly to the point, the pressure upon which in writing causes the ink to ooze down to it just as it is required. These pens are furnished with holders suitable for carrying in the pocket, and thus are always at hand for use with their own supply of ink. The introduction of metallic pens has not lessened the price or the production of goose quills.

PENANCE (Lat. *pœnitentia*, repentance), a penalty accepted or self-imposed by way of satisfaction and token of sorrow for sin. Ecclesiastical penances were inflicted under the Jewish dispensation, and we read in the Old Testament of individuals and whole cities or peoples fasting and performing other acts of humiliation. The idea of penance seems to have been familiar even to heathen nations. The revolting austerities practised by the Hindoo devotees, if they can properly be called penances, are among the most striking examples of this class. In the early Christian church penances were of 3 sorts, secret, public, and solemn. The first consisted of such actions as are commonly imposed by confessors at the present day, as for instance the recitation of certain prayers. Public penance was in use from the earliest days of the church, and accompanied the readmission to communion of persons who had been excluded from it for grievous offences. It was frequently very severe, and the penitents, beside being required to kneel in worship while the rest of the faithful were permitted to stand, had to make a public confession of their sins in the church. Of solemn penance, which seems to have originated about the middle of the 3d century, or soon after the rise of the Novatian heresy, there were 4 degrees. The first was that of the weepers, who remained at the door of the church clad in sackcloth and ashes, and begged the prayers of the faithful as they passed in. The 2d was that of the listeners, who were permitted to enter the vestibule to hear the reading of the Scriptures and the sermon, but went away before the mass of the catechumens commenced. The prostrate, who belonged to the 3d class, knelt in the space between the doors of the church and the *ambo*, or desk where the epistle and gospel were read. They were dismissed at the same time with the catechumens. The 4th degree of penitents were the *consistentes* (literally, co-standers), who stood with the faithful before the altar and remained throughout the service, but might neither make oblations with them nor receive the eucharist. During the term of penance expressions of joy were to be laid aside, gay dresses put off, and marriage, feasting, bathing, and various bodily gratifications abstained from. The men were to cut their hair and beards, and the women to appear with dishevelled locks. The penitents were also expected to abound in good works, and be present, as far as it was permitted them, at every religious assembly. The collection of canons which appointed the time and manner of penances for different sins was called the Penitential. Whether priests and deacons were obliged to submit to the same ceremonies of reconciliation as laymen is not certain. The final readmission of penitents to communion was attended with certain forms, and in ordinary cases the officiating minister was a bishop, though the inferior clergy could admit a penitent from a low degree into a higher one. In the eastern church, the ceremonies of solemn penance were retained until about the close of the 4th century, and in the western church until near the end of the 7th. It gradually became customary for the bishops to commute the canonical penances for pious works more agreeable to the spirit of the age, such as pilgrimages, works of charity, and alms deeds, and these in turn were exchanged for indulgences. (See INDULGENCE.)—In the Roman Catholic church, penance is also the name of one of the 7 sacraments instituted for the remission of post-baptismal sins. It consists of 3 essential parts, contrition, confession to an authorized priest, and absolution, to which may be added a disposition on the part of the penitent to make satisfaction to God and man for his offences. A slight penance by way of satisfaction is always enjoined upon the penitent by the confessor; and though a willingness to receive it is a requisite disposition on the part of the former, the neglect to fulfil it does not invalidate the sacrament. (See CONFESSION, AURICULAR.)

PENANG, PULO PENANG ("Areca island"), or PRINCE OF WALES'S ISLAND, an island belonging to Great Britain, situated in the strait of Malacca, extending from lat. 5° 16′ to 5° 30′ N., and from long. 100° 9′ to 100° 20′ E.; extreme length 15 m., breadth 12 m.; area, 160 sq. m.; pop. in 1855, 89,860. Georgetown is the capital, and seat of government of the British straits settlements, which comprise Penang, the province of Wellesley, Malacca, and Singapore. The channel dividing the island from the mainland is navigable for large vessels, and varies in breadth from 2 to 7 m., the harbor of Georgetown being the N. part of it. The form of Penang is very irregular, and the coasts are bold and indented by several bays. There are many small streams, but no river of any great size on the island. The surface is uneven, and intersected by a mountain range, the highest point of which, West hill, is 2,713 feet above the level of the sea. These heights terminate on the E. and W. in level plains, and the shores are bordered by a belt of cocoanut trees; that on the E. side being more fertile than the W. plain, which is swampy. The whole of the country where not cultivated is densely wooded, and the forests extend to within a short distance of the summits of the mountains, which terminate in rocky peaks. The climate is, upon the whole, healthy. Tin ore is said to be abundant in the mountains, but the mines have never been worked to any great extent. Cloves, tea, cotton, tobacco, coffee, sugar, nutmegs, rice, and numerous tropical fruits and vegetables are grown; and the forests yield timber of a superior quality. Buffaloes, horned cattle, and pigs are abundant, and there are some goats, but sheep do not thrive. There is a bank of pearl oysters on the E. coast. The original inhabitants were a few Malays; but since the British have been in possession of the island, people from Hindostan, Burmah, Siam, China, and all the neighboring islands have settled upon it, nearly ½ of the whole being Chinese. In 1854 the total value of the imports was $2,906,200.—The island of Penang formerly belonged to the king of Queda, but was given by him in 1785 as a marriage portion with his daughter, who married Capt. Light, the master of a British ship trading in the straits of Malacca. The English East India company acquired possession of it by purchase from Light, and appointed him governor; and afterward, in consideration of an annual income paid to the king, the sovereignty of the island and the opposite coast was ceded to them.

PENATES (Lat. *penus*, inmost), the household gods of the Romans, who dwelt in the innermost parts of the house, and were the guardians of the family. They were of two kinds, private and public. The former had always their place at the hearth. In their honor a perpetual fire was kept burning, and at the departure or return of any member of the household, the Penates were saluted in the same manner as the other dwellers in the house. The Lares are probably to be numbered among the Penates, although evidently not the only Penates, as a family rarely had more than one Lar, while the Penates are never spoken of in the singular. Varro says that the number and names of the latter were indefinite. The public Penates of Rome, depicted as two young men holding lances in their hand, had a sanctuary near the centre of the city in a spot called *sub Veliis*. Sacrifices were made to them by generals when departing on their campaigns, and by consuls, prætors, and dictators when they gave up their office.

PENCIL, a delicate brush made from the fine hairs of various animals, especially the camel, badger, squirrel, &c., and used by artists for laying on their colors. The hairs, being selected, are arranged in a little roll, and a string is tightly bound around the end consisting of the roots. The points are also temporarily bound together. The roll is then introduced into the large end of a quill tube, which has been softened by moisture, and is pushed through till the larger end is arrested by the narrowness of the aperture. As the quill dries, the increased pressure caused by its contraction holds the hairs securely in their place, the points projecting through to make the pencil or brush; but it is essential that the pressure should not be so great as to make the points spread apart when these are untied. The finest pencils require very careful selection and arrangement of the hairs, and much experience for obtaining a round and even point. The holder of the pencil is made by inserting a light stick into the large end of the quill. The quills used vary in size according to the kind of pencil, from that of the wing of the crow to that of a swan; larger pencils than these are made by the use of a socket of sheet tin.—A lead pencil is a sort of crayon used in drawing, made of slips of the mineral graphite or plumbago, as described in the article GRAPHITE. Colored pencils are also prepared by the use of various coloring substances in the place of graphite, as reddle, a red ochre for red pencils, &c. The coloring substance is reduced to powder, formed into a paste with gum Arabic, and moulded into hollow cylinders of wood. Pencils for the slate are strips of slate itself made round and smooth. Artificial ones have been made of the powder of slate moulded with vulcanized India rubber; but pencils into which this material enters have always the unpleasant odor of the vulcanized rubber.

PENDLETON. I. A central co. of Va., enclosed between two ranges of the Alleghanies, and intersected by the south branch of the Potomac river and two of its tributaries; area about 800 sq. m.; pop. in 1860, 6,165, of whom 244 were slaves. Its surface is mountainous and covered with forests, and the soil not very fertile. The productions in 1850 were 109,838 bushels of Indian corn, 44,137 of wheat, 29,930 of oats, 7,664 tons of hay, 26,107 lbs. of wool, and 69,306 of butter. There were 20 grist mills, 40 saw mills, 7 wool-carding mills, 7 tanneries, 12 churches, and 225 pupils attending public schools. Capital, Franklin. II. A former district of S. C., in the N. W. corner of the state, now included in the two districts of Pickens and Anderson. III. A N. co. of Ky., bordered N. E. by the Ohio river, and intersected by the Licking; area, 300 sq. m.; pop. in 1860, 10,443, of whom 424 were slaves. It has an undulating and well wooded surface and fertile soil. The productions in 1850 were 429,855 bushels of Indian corn, 44,207 of oats, 253,827 lbs. of tobacco, 20,166 of wool, and 253,827 of butter. There were 8 grist mills, 2 saw mills, 14 churches, and 880 pupils attending public schools. It is intersected by the Covington and Lexington railroad, which passes through the capital, Falmouth.

PENDLETON, EDMUND, an American statesman and jurist, born in Virginia, Sept. 9, 1721, died in 1803. He began his career as an apprentice in the clerk's office of Caroline co., in 1740 was made clerk of the county court martial, and in 1741 was licensed to practise law. In 1751 he became one of the county justices, and in the following year was elected to the house of burgesses. These posts he continued to fill until 1774, at which time he presided in Caroline court, and discharged the trust of county lieutenant. He was elected to the colonial convention of 1774, consequent on the Boston port bill, and chosen by that convention to the first congress. He accordingly attended in Philadelphia in 1774, and again in 1775, in company with Peyton Randolph, George Washington, Patrick Henry, Benjamin Harrison, and Richard Henry Lee. In 1775 he presided over the colonial convention, and was appointed president of the committee of safety. In May, 1776, he again presided in the convention, and drew up the celebrated resolution of that body, instructing the delegates from Virginia to propose in congress a declaration of independence. After the inauguration of the commonwealth he was called to preside over the first house of delegates, and was appointed by that body, in conjunction with Chancellor Wythe and Mr. Jefferson, to revise the colonial laws. In March, 1777, by a fall of his horse, he received an injury of the hip joint which made him a cripple for life. In the same year he was unanimously reëlected speaker of the house of burgesses. On the organization of the chancery court that year he was again unanimously elected its president; and when, in 1779, the court of appeals was constituted, he also became its president. This last responsible position he held till his death. He was elected to the state convention of 1788, in which was to be considered the proposed constitution of the United States, and was appointed to preside over its deliberations. In those deliberations he took a leading part, and, by a masterly advocacy of the great national compact, justified the high encomium of Jefferson: "Taken all in all, he was the ablest man in debate I ever met with."

PENDLETON, HENRY, an American jurist, born in Virginia about the middle of the 18th century, died in South Carolina in 1788. He emigrated to South Carolina before the revolution, and in April, 1776, was elected to the judiciary of the colony. When the state was overrun by the British in 1780, he took up arms on the patriotic side, and served until the close of the war, participating in the final battle of Eutaw Springs. In 1782 he resumed his judicial duties, and was the author of the county court act of South Carolina. In 1785 he was one of the 3 judges appointed to make a digest of the laws of the state, and in 1788 he was a member of the convention which ratified the constitution of the United States.

PENDULUM. See CLOCKS AND WATCHES, and MECHANICS, vol. xi. p. 324.

PENDULUM, BALLISTIC. See GUNNERY.

PENELOPE, a gallinaceous bird. See GUAN.

PENELOPE, the wife of Ulysses and mother of Telemachus. She was the daughter of Icarius, and having many suitors, her father promised to give her to the one who should conquer in a foot race. The victor was Ulysses, and when her father urged her to remain with him and not accompany her husband to Ithaca, the hero gave her leave to do as she pleased. She indicated her resolution to go with him by covering her face with a veil to hide her blushes, whereupon Icarius erected a statue of Modesty on the spot. While Ulysses was at the siege of Troy, she was surrounded by many importunate suitors, whom she deceived by declaring that she must finish a robe which she was weaving before she could make up her mind. But she unravelled each night all that she had done during the day; and when at last the suitors discovered her stratagem, Ulysses opportunely arrived after 20 years' absence and killed them all. She was regarded as a model of a chaste, faithful, and industrious wife, though some writers later than Homer give her a very different character, alleging that by Mercury or by all the suitors together she became the mother of Pan, and was repudiated by her husband on his return from Troy.

PENGUIN, a sub-family of web-footed, imperfectly winged birds, inhabiting the seas around the rocky coasts, islands, and ice fields of the southern Pacific ocean, and the extreme portions of South America and Africa—the *manchots* of the French. Some of the earlier writers give this name to the auk (*alca*, Linn.) of the arctic seas, but it will here be restricted to its more modern application to the antarctic sub-family.—In the genus *aptenodytes* (Forst.) the bill is slender, longer than the head, compressed on the sides, and slightly curved at the point, which is acute; the upper mandible is clothed with short close-set plumes as far as the nostrils, which are in a lateral groove in the middle of the bill, and the lower is covered with a smooth naked skin; the wings are very small, fin-shaped, without quill feathers, having only short imbricated plumes with flattened shafts, and are unfit for flight; the tail is very short, flat, of narrow rigid feathers; the tarsi very short and flattened; the toes short and depressed, the anterior united by a web, and the hind one very small and almost entirely connected to the inner side of the tarsus; the claws large, flat, and slightly curved. As in the other genera, the breast bone is deeply incised behind on each side; the scapula is large and broad, and flat behind; the bones of the forearm and arm are very flat, the former making with the latter a rather obtuse angle; the feet are very far back, and the whole posterior surface of the tarsus touches the ground when the bird stands; the bones are heavy, filled with marrow, and without air cavities. The Patagonian penguins of Shaw and Pennant were different birds to which the same name had been given; to avoid confusion G. R. Gray calls one the emperor and the other the king penguin, or *A. Forsteri* and *A. Pennantii*. In the former the length is 50 inches and the bill 5, in the latter 44 and 4½; the general color of both is slate above and white below, with the head and throat black, the latter in the first species divided in front by a point of the white feathers of the chest, and in the 2d ending in a blunt point; there is an orange yellow stripe on the sides of the head, descending and passing gradually in the former and suddenly in the latter into the white of the chest. The plumage is soft and close, with a silvery gloss below, this part being used by fur dealers for tippets and collars; the neck is short and stout, the skin hard and thick, and the belly loaded with fat. They are found in immense numbers about the straits of Magellan, the Falkland islands, and the western group of the S. Pacific islands; they group themselves, when on shore (which is only during the breeding season), in regular ranks like soldiers, classed strictly according as they are young, moulting, incubating, or with perfect plumage, those of one class not being permitted to intrude upon another. They present a strange appearance as they sit upright; they employ their wings like anterior limbs on land, crawling along on the belly pretty fast to and from their breeding places in the manner of quadrupeds; they are excellent swimmers, and fly swiftly under water, using their wings as fins, and breasting the most violent waves; though stupid and rather helpless birds, they often boldly attack intruders on their breeding places, inflicting severe wounds with their sharp bills; the food is principally animal, consisting of fishes and crustaceans. The eggs are laid on the ground or in holes, and are hatched by keeping them close between the thighs; the males collect food for the females, which become very fat during incubation; the young birds also get very fat before they quit the breeding places, which are covered with excrements and remains of dead birds, accumulated into heaps of guano during many successive years. The flesh of the penguin, though black and fishy, is considered eatable by hungry mariners.—In the genus *catarrhactes* (Briss.) the bill is moderate, strong, compressed, grooved on the sides, and slightly hooked at the tip, with the end of the lower mandible truncated; the tail is long, of narrow rigid feathers; the toes are long and strong. Several species are described, inhabiting in small parties the southern ocean, in open water or on fields of ice, sometimes more than 800 m. from land; they go to the shore only in the breeding season; they are more active, if possible, than the preceding genus, and swim and dive with great quickness; their cries are harsh and discordant, resembling the bray of a donkey. The crested penguin (*C. chrysocoma*, Gmel.) is as large as a stout duck, black above and white below, with a yellowish white crest on each side of the head, and red bill and feet; it inhabits the vicinity of the Falkland islands and Tasmania.—In the genus *spheniscus* (Briss.) the bill is much as in the last, with a more hooked tip and the nostrils uncovered in the middle of the lateral groove; the tail and tarsi are very short, and the toes and claws long. The species are few, found about the rocky islands of the southern ocean, and on the W. coast of South America and Africa; the habits are the same as in the preceding genera. The Cape or jackass penguin (*S. demersus*, Linn.), from the Cape of Good Hope, is black above and white below, with a white stripe over the eyes, the throat black, and a black line on the breast continued along each flank; the bill is brown, with a white band across the middle of its length; the length is 21 inches; its common name is derived from the resemblance of its voice to a bray. It comes to the surface of the water to breathe with such a spring and dives again so quickly, that it seems more like a fish leaping for sport than a bird; it seems perfectly at home in this element. Humboldt's penguin (*S. Humboldti*, Meyen), common on the coast of Peru, resembles the last, but is larger; it is readily tamed, and follows its master about like a dog. The Magellanic penguin (*S. Magellanicus*, Forst.) is 2 feet long, and sometimes weighs 20 or 30 lbs.; the general color is black above and white below, with white streaks on the sides of the head and a black band on the breast; it is found about the southern parts of South America, and is well known to navigators, who have long been in the habit of invading its breeding places, and killing the birds for food or for sport.

PENN, Granville, an English author, born Dec. 9, 1761, died at Stoke Park, Buckinghamshire, Sept. 28, 1844. He was the grandson of William Penn, served for a time as chief clerk in the British war office, and by the death of his brother (1834) came into the possession of the family estates. He wrote "Critical Remarks on Isaiah vii. 18;" "Remarks on the Eastern Origination of Mankind, and of the Arts of Cultivated Life;" "A Comparative Estimate of the Mineral and Mosaic Genealogies;" "Memorials of the Professional Life and Times of Admiral Sir William Penn" (London, 1833), and many other works, the most important being a translation of the New Testament with annotations under the title of "The Book of the New Covenant" (2 vols., London, 1836).

PENN, Sir William, an English admiral, born in Bristol in 1621, died in Wanstead, Essex, Sept. 16, 1670. He early entered the naval service, and before he was 32 years old had gone through the grades of captain, rear admiral of Ireland, admiral to the straits, vice-admiral of England, and general. He was one of the commanders in the expedition that took Jamaica from the Spaniards in 1655, and on his return in the same year was elected member of parliament from Weymouth, but was for a time confined in the tower on the charge of having absented himself from his command without leave. In 1660 he was made commissioner of the navy, governor of Kinsale, vice-admiral of Munster, and a member of the council of that province. He was also knighted. Entering the naval service again in 1664, he was captain-commander under the duke of York in the victory gained over the Dutch off Lowestoffe in 1665. In 1666 he left the naval service, but retained his other offices until 1669, when he went into retirement altogether. He was the author of several tracts designed to improve the naval service.

PENN, William, an English Quaker, the founder of Pennsylvania, born in London, Oct. 13, 1644, died at Ruscombe, Berkshire, July 30, 1718. He was the son of Admiral Penn, who, notwithstanding his hostile professional relations with the Dutch, took to wife a woman of that nation, Margaret, daughter of John Jasper, a merchant of Rotterdam, to whose noble and religious character and judicious government the son owed many of the excellent traits by which he was through life distinguished. William Penn received his first education at the free grammar school of Chigwell, Essex, where he experienced strong religious impressions. When only 11 years of age he was the subject of deep exercises of spirit, which in the language of the time are represented almost as miraculous. While alone in his chamber he fancied himself surrounded by an external brightness which seemed to answer to a mysterious motion within, and he regarded himself as called by this experience to a consecration of heart and life to the service of God. At the age of 12 he was removed from Chigwell to receive private instruction at home, and 3 years later entered Christchurch college, Oxford, where he numbered among his companions John Locke. While in college, Penn, through the influence of Thomas Loe, became a convert to Quakerism, and not only refused to conform to the worship of the established church or to wear the surplice of a student, which he considered a relic and emblem of popish superstition, but, with some of his companions who had embraced his principles, assaulted several of the students in public and stripped from them their robes. For this outrage he was expelled, and on his return home his father, a worldly and ambitious man who was aiming at a peerage, and was greatly vexed and mortified by his son's fanatical associations and conduct, beat him and drove him from the house. A reconciliation however soon took place, and in 1662 the admiral sent his son to France, in hopes that the gayety of Paris might counteract the soberness of his Quakerism. The youth, however, had no taste for the dissipation of the French capital, and preferred to study theology at Saumur with the famous Calvinistic divine and professor Moses Amyrault. After travelling as far as Turin he was recalled home by his father in 1664, and is thus mentioned by Pepys in his diary, under date of Aug. 30: "Mr. Penn, Sir William's son, is come back from France, and come to visit my wife; a most modish person, grown, she says, a fine gentleman." Without losing his religious seriousness, he had acquired on the continent more polish and courtesy and liveliness of manners. In compliance with his father's wishes he entered as a student of law at Lincoln's Inn, but shortly after, just as he became of age, was driven from London by the great plague of 1665. Under the influence of that terrible visitation his religious impressions acquired redoubled force; and when his father returned from sea in 1666, he found his son more demure in looks and formal in language than ever before. He made another effort to change these tendencies by sending the young man to Ireland, and committing to him the management of two large estates which he owned in the county of Cork. Penn readily assumed this charge, and executed it to the entire satisfaction of his father; but encountering again at Cork his former teacher, Thomas Loe, he was induced to attend Quaker meetings, at one of which, Sept. 3, 1667, he was apprehended with others and carried before the mayor, on a charge of attending unlawful assemblies. Refusing to give bonds for his future good behavior, he was sent to prison. He wrote, however, to the lord president of the council of Munster, with whom he was personally acquainted, who procured his immediate discharge. From this time he identified himself with the Quakers in every thing except costume, and on returning to England soon after became involved in disputes with his father, who was greatly shocked at his departure from established forms, but finally offered to compromise the matter by tolerating every other peculiarity if his son would only agree to remove his hat in his presence and in that of the king and the duke of York. Penn before answering retired to his chamber, and after deliberation and prayer declared that he could not remove his hat by way of compliment to any one. His father at once turned him out of doors. This persecution confirmed Penn still more in his Quakerism, and he soon became a prominent preacher at the meetings of the Friends. Through the influence of his mother his father's indignation was so far softened that he permitted his son to return home, and used his interest with the government to relieve him from the persecutions to which his attendance at the prohibited meetings frequently subjected him. In 1668 Penn made his first appearance as an author by issuing a crude and acrimonious treatise entitled "Truth Exalted, in a short but sure Testimony against all those religious Faiths and Worships that have been formed and followed in the darkness of Apostasy; and for that Glorious Light which is now risen and shines forth in the Life and Doctrine of the despised Quakers as the alone good old way of Life and Salvation. Presented to Princes, Priests, and People, that they may repent, believe, and obey. By William Penn, whom Divine Love constrains in an holy contempt to trample on Egypt's glory, not fearing the King's wrath, having beheld the Majesty of Him who is invisible." This was followed by a considerable number of tracts on similar topics, which with his other writings have been collected and published by Joseph Besse (2 vols. fol., London, 1726). In 1668 he published "The Sandy Foundation Shaken," an attack upon "those so generally believed and applauded doctrines of one God subsisting in three distinct and separate persons; of the impossibility of God's pardoning sinners without a plenary satisfaction; and of the justification of impure persons by an imputative righteousness." This work caused a great excitement by its bold opposition to the commonly received doctrine of the Trinity, and Penn was apprehended and imprisoned in the tower for 9 months, during which he wrote his principal and most popular theological work, "No Cross, No Crown; a discourse showing the Nature and Discipline of the Holy Cross of Christ." By the interference of the duke of York he was at length released and permitted to live in his father's house, though the admiral would not admit him to his presence. He had however such confidence in his son's integrity, that he gave him through his mother a commission to go again to Ireland to look after his estates. On his return Penn was reconciled to his father, and lived with him on good terms till the latter's death in Sept. 1670, though before that event the son had once more been committed to prison with another Quaker for preaching in the streets. He was not, however, convicted of the charge, the jury, after a remarkable trial (during which they were kept for two days and nights without food, fire, or water), bringing in a verdict of not guilty, for which each juryman was fined 40 marks and sent to Newgate; while Penn and his companion were also fined and imprisoned for contempt in wearing their hats in presence of the court. They appealed to the court of common pleas, where the decision of the lower court was reversed, and the great principle of English law established that it is the right of the jury to judge of the evidence independent of the dictation or direction of the court. The admiral bequeathed to his son an estate of £1,500 a year, with large claims against the government; and thenceforth the cares of business and the duties of his lay ministry seem to have equally divided the time of Penn. In March, 1671, while preaching in a meeting house in London, he was arrested and committed to the tower, and was soon afterward tried under the conventicle act, but acquitted for want of testimony. The magistrates, however, required him to take the oath of allegiance, which he refused to do from conscientious scruples about swearing, and was consequently sentenced to Newgate for 6 months. While in prison he wrote and published 4 treatises, one of them entitled "The great Case of Liberty of Conscience," which is a good comprehensive statement of the principle of religious toleration, then so little understood. On regaining his liberty he made a tour in Holland and Germany, interceding with the rulers of those countries in behalf of the persecuted Quakers, and on his return home in the beginning of 1672 married Gulielma Maria Springett, daughter of Sir William Springett, and went to reside at Rickmansworth in Hertfordshire. The next few years were devoted to preaching and to defending by his pen the doctrines of the Quakers from various assailants, in reply to whom he published a numerous series of laborious tracts and books. In 1674 his attention was called to the Quaker colonies in New Jersey by a dispute between Fenwick and Byllinge, both Quakers, about their proprietary rights in the colony. The case being submitted to Penn's arbitration, he decided in favor of Byllinge, who subsequently, being too much embarrassed to improve his property, made it over to Penn and two of his creditors as trustees. Penn immediately engaged with zeal in the work of colonization, and at length in 1681 obtained from the crown, in payment of a debt of £16,000 due to his father, a patent for the territory now forming the state of Pennsylvania. The charter vested the perpetual proprietaryship of this vast region in him and his heirs, on the fealty of the annual payment of two beaver skins. He designed at first to call his territory New Wales, and afterward suggested Sylvania as applicable to a land covered with forests; but the secretary who made out the patent insisted on prefixing "Penn" to Sylvania. Penn offered him 20 guineas to leave off his name, and, the offer being refused, complained to the king, who insisted that Pennsylvania should be the designation, in honor, as he said, of his late friend the admiral. In Feb. 1682, Penn became, with 11 others, a joint purchaser of East Jersey, which was already a flourishing colony. Aided by the advice of Sir William Jones, and of Henry, the brother of Algernon Sidney, he drew up a liberal scheme of government and laws for his colony, and in Aug. 1682 embarked for the Delaware, reaching that river after a voyage of 6 weeks. He was received by the settlers with great enthusiasm, and after several meetings for conference and treaties with the Indians, he held his famous treaty with them under a large elm tree at Shackamaxon, now Kensington, probably on the last day of Nov. 1682. A numerous assembly of the Delawares, Mingoes, and other Susquehanna tribes met on this occasion, and formed with the Quakers a treaty of peace and friendship, the only treaty, says Voltaire, "never sworn to and never broken." Soon afterward he laid out the plan of Philadelphia, to which he gave its name in the hope that brotherly love might characterize its inhabitants. He purchased the land where the city stands of the Swedes, who had purchased it of the Indians. He now devoted himself zealously to his duties as governor, and made treaties with 19 Indian tribes; and so long as any of the aborigines remained in Pennsylvania or its neighborhood, their traditions bore testimony to the strong impression which the justice and benevolence of Mignon as the Delawares called him, or of Onas as he was styled by the Iroquois, made on their savage hearts. Penn visited New York and New Jersey; and after meeting with the general assembly of the province at New Castle in May, 1684, he intrusted his government to a council, and in August terminated his first visit to America by sailing for England, leaving behind him a prosperous colony of 7,000 people. During his absence the Quakers had suffered severe persecution in England, and Penn's first care was to intercede in their behalf with the king, from whom he obtained the promise of entire relief for them at an early period. Charles II. died Feb. 11, 1685. James II., who succeeded, had been the pupil in naval affairs of Penn's father, and was his own intimate friend. Penn took lodgings at Kensington to be near the court, upon which he constantly attended, and where he had such influence that his house was thronged by hundreds of suitors asking his intercession in their behalf. His intimacy with the king led to foolish suspicions that he was secretly a Jesuit, and in April, 1685, he published a pamphlet entitled "Fiction Found Out," to rebut the charge. In 1686, partly through his influence, a proclamation was issued by the king and council for the release of those imprisoned on account of religion, and upward of 1,200 Quakers were set free. This was followed in April, 1687, by a proclamation declaring liberty of conscience to all, and removing all tests and penalties. Penn meanwhile made a tour on the continent, during which by order of the king he had a conference with William, prince of Orange, whom he endeavored to convert to his views of universal toleration. Soon after the revolution of 1688, and the accession of William to the throne of England, Penn was called before the council to answer to a charge of treason; but no evidence appearing against him, he was discharged. Soon afterward, a letter from the exiled James requesting him to come to France having been intercepted, he was again arrested and brought before the council in presence of King William; but after a long examination, in which he declared his friendship for James though he did not approve his policy, and said he could not prevent him from writing to him, he was discharged. A third time, in 1690, he was arrested on a charge of conspiracy, tried by the court of king's bench, and acquitted. But in the following year the charge was renewed by an informer named Fuller, whom the house of commons afterward branded as a cheat, a rogue, and a false accuser; and to avoid arrest he concealed himself, though not very closely. Meantime Pennsylvania had been greatly disturbed by civil and religious quarrels, and such representations of the state of the colony were made in England, that in Oct. 1692 the king and queen deprived Penn of his authority as governor, and directed Gov. Fletcher of New York to take upon himself the administration of Pennsylvania. Powerful friends, among them Locke, Tillotson, and the duke of Buckingham, now interceded in his behalf with the king; and he had a hearing before the council on the charges against him, and was honorably acquitted in Nov. 1693. Shortly afterward, in Feb. 1694, his wife died, and he bore testimony to her virtuous life and Christian death in "An Account of the Blessed End of my dear wife Gulielma Maria Penn." Within two years he married a second wife, Hannah Callowhill, a Quaker lady. His government was restored to him in Aug. 1694; and in Sept. 1699, he sailed on a second visit to America, accompanied by his wife and daughter. He found the colony in a prosperous condition, its troubles having subsided, and was warmly received by the people. He immediately gave his earnest attention to various reforms, and especially to the amelioration of the condition of the Indians and negroes. His plans, however, were arrested by tidings from England that a measure was pending before the house of lords for bringing all the proprietary governments under the crown. This led him to return to England in 1701. One of his last official acts before he embarked was to make Philadelphia a city by a charter signed Oct. 25, 1701. Soon after his arrival in England the project of bringing the proprietary governments under the crown was dropped. For several years after this he was involved in great trouble by the affairs of Pennsylvania, where his son, whom he had sent there as his representative, had disgraced him by vicious and riotous conduct, while his trusted agent in the colony, a Quaker named Ford, proved dishonest and left to his executors false claims against Penn to a very large amount. To avoid extortion Penn suffered himself to be committed to the Fleet prison in 1708, where he remained a long time, till he was released by the assistance of his friends, who compounded with his creditors. Wearied at length with the trouble and expense of his government, he had in 1712 made arrangements for the transfer to the crown of his rights as proprietor for £12,000, when he sustained repeated shocks of paralysis; and though he lived 6 years longer, he never regained his mental vigor, and for much of that period was deprived of memory and of the power of motion. He was interred in Jordan's burial ground, near the village of Chalfont St. Giles, in Buckinghamshire. —The reputation of William Penn in his own day did not escape suspicion and censure. The extraordinary mingling of Quaker simplicity and court influence which marked his life gave rise to many imputations upon his character, which have been revived in the present day with much force and pertinacity by Lord Macaulay in his "History of England." Admitting that Penn was without doubt a man of eminent virtues; that he had a strong sense of religious duty and a fervent desire to promote the happiness of mankind; that on one or two points of high importance he had notions more correct than were, in his day, common even among men of enlarged minds; and that he will always be mentioned with honor as a founder of a colony who did not in his dealings with a savage people abuse the strength derived from civilization, and as a lawgiver who, in an age of persecution, made religious liberty the corner stone of a polity, the distinguished historian alleges that "his writings and his life furnish abundant proofs that he was not a man of strong sense. He had no skill in reading the characters of others. His confidence in persons less virtuous than himself led him into great errors and misfortunes. His enthusiasm for one great principle sometimes impelled him to violate other great principles which he ought to have held sacred. Nor was his integrity altogether proof against the temptations to which it was exposed in that splendid and polite, but deeply corrupted society with which he now mingled. . . . . Unhappily it cannot be concealed that he bore a chief part in some transactions condemned, not merely by the rigid code of the society to which he belonged, but by the general sense of all honest men. He afterward solemnly protested that his hands were pure from illicit gain, and that he never received any gratuity from those whom he had obliged, though he might easily, while his influence at court lasted, have made £120,000. To this assertion full credit is due. But bribes may be offered to vanity as well as to cupidity; and it is impossible to deny that Penn was cajoled into bearing a part in some unjustifiable transactions of which others enjoyed the profits." Among the transactions to which Macaulay here alludes was an attempt to persuade Dr. Hough, president of Magdalen college, Oxford, to comply with the wishes of King James in a matter where compliance would have involved a violation of his official oath, by holding out to him the bait of a bishopric. But Dr. Hough himself, in his account of the conversation with Penn, intimates that the Quaker was only speaking in jest—"had a mind to droll upon us." Another and more serious charge is that Penn submitted to be made an agent of the rapacious maids of honor of the royal court to extort money for pardons from the relatives of some young girls at Taunton who were implicated in Monmouth's rebellion. The only foundation for this charge is a letter relating to the transaction written by the earl of Sunderland, which begins thus: "Mr. Penne, her majesty's maids of honor having acquainted me that they design you and Mr. Walden in making a composition with the relations of the maids of Taunton;" and Macaulay assumed without hesitation that the person to whom it was addressed was William Penn. But it has been recently proved by the regis-ters of the privy council, that at this very time a certain George Penne was engaged as a pardon broker at Taunton, and it is most probable that the letter was addressed to him rather than to the respectable and influential Quaker. In the edition of 1858, Macaulay considers the strictures on his previous statements, and says: "If I thought that I had committed an error, I should have, I hope, the honesty to acknowledge it; but after full consideration, I am satisfied that Sunderland's letter was addressed to William Penn."—See "Life of William Penn," by George E. Ellis, in Sparks's "American Biography," 2d series, vol. xii. (Boston, 1852); Hepworth Dixon's "Life of Penn" (new ed., London, 1856); and "Inquiry into the Evidence of the Charges brought by Lord Macaulay against William Penn," by J. Paget (Edinburgh, 1858).

PENNANT, THOMAS, LL.D., an English naturalist and antiquary, born in Downing, Flintshire, June 14, 1726, died there, Dec. 16, 1798. He was educated at Wrexham and at Oxford. At the age of 12 he was presented with the "Ornithology" of Francis Willughby, the reading of which inspired him with a taste for natural history. An account which he wrote of an earthquake felt in Flintshire, April 2, 1750, appeared without his knowledge in the "Philosophical Transactions;" and in 1756 he contributed to the same work an article on certain coralloid bodies occurring in Shropshire. This coming under the notice of Linnæus, he was elected upon his recommendation a member of the royal society of Upsal. In 1761 appeared the first part of his great work on "British Zoology." This treatise, which was translated into Latin and German, embraced nearly every species of the animal kingdom then known to exist in Britain, with the exception of insects. The best edition is that of 1776 (4 vols. 4to.). During the publication of the work, he travelled on the continent (1765), and became acquainted with Buffon, Haller, Trew, Gronovius, Pallas, and other men of science. On his return he began a work on "Indian Zoology," which was speedily discontinued. He made a journey into the northern part of Scotland in 1769, and another in 1772, of both of which he published accounts. In 1771 appeared his "Synopsis of Quadrupeds," which was subsequently enlarged and republished under the title of a "History of Quadrupeds." Shortly afterward he began a work called "The Genera of Birds," which was never completed. His "Arctic Zoology" (3 vols. 4to., 1784–'7) contains descriptions of many species previously unknown, and in its compilation he was largely assisted by foreign naturalists. In 1793 he published an autobiography entitled "The Literary Life of the late Thomas Pennant," stating in the advertisement that his existence as an author ended March 1, 1791. Speedily reviving, however, he published several other works, among which were "Outlines of the Globe," vols. i. and ii., including "Views of Hindostan," forming the first portions of a work designed to embrace an account of every country in the world. Two additional volumes were issued after his decease by his son, completing eastern Asia. Pennant also wrote "A Tour in Wales" (4to., 1778); "A Journey from Chester to London" (1782); an "Account of London" (1790); and the "History of the Parishes of Whiteford and Holywell" (1796). He wrote too much and too rapidly to be accounted an authority of the highest kind, although his attainments, especially in the department of natural history, were of a very respectable order.

PENNANT'S MARTEN. See FISHER.

PENNSYLVANIA, one of the 13 original states of the American Union, included in the middle states, and now the second in wealth and population in the Union. Its geographical position is nearly central as regards the area of the original colonies, a position which is popularly recognized in the customary designation of this as the "keystone state." Pennsylvania was somewhat indefinitely bounded as originally granted by charter; but in the final adjustment of colonial limits it was made a nearly perfect parallelogram W. of the Delaware river, a small addition being made at its point of contact with Lake Erie to give it access to lake navigation and a good harbor. It is bounded N. by Lake Erie and New York, mainly along a right line at lat. 42° 15′ N.; E. by the Delaware river, which separates it from New Jersey along an irregular line between long. 74° and 75° W.; S. by Delaware and Maryland along a right line at lat. 39° 43′ N.; and W. by Virginia and Ohio, along a right line at long. 80° 36′ W.; average length 310 m., width 160 m.; area, about 46,000 sq. m., or 29,440,000 acres. The state is divided into 66 counties, viz.: Adams, Alleghany, Armstrong, Beaver, Bedford, Berks, Blair, Bradford, Bucks, Butler, Cambria, Cameron, Carbon, Centre, Chester, Clarion, Clearfield, Clinton, Columbia, Crawford, Cumberland, Dauphin, Delaware, Elk, Erie, Fayette, Forest, Franklin, Fulton, Greene, Huntingdon, Indiana, Jefferson, Juniata, Lancaster, Lawrence, Lebanon, Lehigh, Luzerne, Lycoming, Mercer, M'Kean, Mifflin, Monroe, Montgomery, Montour, Northampton, Northumberland, Perry, Philadelphia, Pike, Potter, Schuylkill, Snyder, Somerset, Sullivan, Susquehanna, Tioga, Union, Venango, Warren, Washington, Wayne, Westmoreland, Wyoming, York. The chief cities and towns are: Harrisburg, the seat of government; Philadelphia, the commercial centre of the state; Pittsburg, Reading, Lancaster, Pottsville, Easton, Erie, York, Norristown, Allentown, Scranton, Williamsport, Danville, Wilkesbarre, Carlisle, Gettysburg, Columbia, Phœnixville, Chester, West Chester, Lebanon, Chambersburg, Hollidaysburg, Brownsville, Beaver, Meadville, Honesdale, Mauch Chunk, Port Carbon, and Bristol. —The following statement exhibits the decennial progress of population since 1790

Census.	Whites.	Free colored.	Slaves.	Total.	Increase per cent.
1790	424,099	6,537	3,737	434,373	....
1800	586,094	14,564	1,706	602,365	38.7
1810	786,804	22,492	795	810,091	34.5
1820	1,017,094	32,153	211	1,049,458	29.5
1830	1,309,900	37,930	403	1,348,233	28.5
1840	1,676,115	47,854	64	1,724,033	27.9
1850	2,258,160	53,626	....	2,311,786	34.1
1860	....	....	....	2,916,018	26.1

Ratio to the total population of the United States in 1850, 10.03 per cent.; population to the square mile in 1850, 63. The population of 1850 was classified as follows: white males, 1,142,734; white females, 1,115,426; colored males, 25,369; colored females, 28,257. Born in the state, 1,844,672; in other states, 161,129; in England, 38,048; in Ireland, 151,723; in Scotland and Wales, 16,212; in British America, 2,500; in Germany, 78,592; in France, 4,083; in other countries, 7,796; unknown, 3,296. Total of foreign birth, 296,985, or nearly 13 per cent. The leading occupations in 1850 were: agriculture, 207,535; manufactures, 105,883; commerce and trade, 21,309; learned professions, 9,901. Deaths in the year ending June 1, 1850, 28,551, or 1.2 per cent. of the population; paupers, 11,551; deaf and dumb, 1,145; blind, 969; insane, 1,914; idiotic, 1,467.—The surface of Pennsylvania is level in the S. E., hilly and mountainous in the interior, and generally level or arable in the W. The S. E. counties are but little elevated above the sea, but in proceeding westward and northward a series of ridges are met, rising higher and becoming more abrupt to the Blue ridge and the Alleghanies. These ridges and mountains all trend N. E. and S. W., those eastward of the Alleghany range being precipitous, but westward from this range the surface declines toward the Ohio river and Lake Erie in gradual slopes. The passes of this interior range are about 2,000 feet above the sea, the lower valleys of the Ohio where it leaves the state, and the plain bordering Lake Erie, being about 800 and 650 feet respectively. The interior valley through which the Susquehanna river flows is but little elevated above the sea, and it occupies a large area, dividing the mountainous belt. The mountains of the state are part of the great Appalachian chain. At the N. E. they connect with the Shawangunk mountains of New York and the Blue ridge of New Jersey, the last named being continued southwestward through the entire state and into Maryland under the same name. The Blue ridge is about 1,500 feet high. The only considerable mountain S. and E. of this ridge is the South mountain, a broken chain of ridges about 1,000 feet high at the highest portions. Next N. and W. of the Blue ridge a number of sharp irregular mountain ridges succeed, the Tuscarora, Path Valley, Broad Top, Sideling hill, Shade, Black Log, and Tussey's mountain S. W. of the Susquehanna; and Mahanoy, Sharp mountain, Lackawanna, Wyoming, Moosic, Pocono, and Nesquehoning, N. E. of the Susquehanna. Beyond all these is the Alleghany range proper, which extends in a curved line through the entire state, connecting with the chief range of the same name in other states. Its highest ridges are the Eagle, Chestnut, and Laurel ridges, which are 2,500 feet high on an average, with some peaks of 3,000 feet. They pass out of the state at the S. W. into Maryland and Virginia. The ridges E. of the Alleghany range are too abrupt for cultivation, but its W. slope is nearly all arable, even at an elevation of 1,800 or 1,500 feet. The valleys of Pennsylvania correspond to the mountain ridges in the central part of the state. They generally cross the line of the great rivers, conforming to the mountain configuration. Chester valley in the S. E., Wyoming and Lackawanna valleys in the N. E., Juniata and Sinnemahoning in the centre, Cumberland in the S., and Monongahela valley in the S. W., are the principal. Many deep narrow valleys occur in the mountainous region which traverses the state from N. E. to S. W. in a belt 150 m. wide and 250 m. long.—The Delaware river, which forms the E. boundary of the state, has tide water 132 m. from the sea to Trenton, and great depth at Philadelphia, the average depth at the wharf line of that city exceeding 45 feet. It is navigable for the largest ships to Philadelphia, for steamboats of large size to Trenton, and for small steamboats to Easton. It breaks through the Blue ridge at the Delaware Water Gap, above which it is not navigable. The Susquehanna river drains the central part of the state, and runs southward to Chesapeake bay; it is a rapid, broad, and shallow river, not navigable for steamboats in Pennsylvania, but it floats great quantities of timber. Canals along its banks convey coal and produce in great quantities. The Susquehanna has two great branches, the North branch rising in New York, and having an irregular course of 250 m. to Northumberland, the point of junction, and the West branch rising W. of the Alleghanies, through which it breaks eastward, and is 200 m. long. Below Northumberland, 130 m. from the sea, the course of this river is more direct. The Ohio river and its branches drain the W. part of the state; the Alleghany river drains the N. W. part, and has a length of 160 m., running southward to Pittsburg; the Monongahela, rising in Virginia, has a course northward within the state of 70 m. to Pittsburg. Both these last are navigable for steamboats about 60 m. each, and the Ohio, below their point of junction, is a great thoroughfare for steam navigation. The Juniata, a tributary of the Susquehanna from the west, and the Lehigh and Schuylkill, tributaries of the Delaware, are the principal remaining rivers, each having canals and lock navigation. There is no considerable lake within the state, but it borders on Lake Erie for a distance of 45 m., affording access to its navigation and a superior harbor at Erie.—The geological formations of Pennsylvania are limited to a few only of the great divisions of the rocks. These are metamorphic (including the gneissic as well as the altered lower palæozoic groups); the palæozoic series from the Potsdam sandstone to the coal measures; and the middle secondary red sandstone. The tertiary and upper secondary, developed on the E. side of the Delaware, do not extend to the other side of the river. The northern drift formation of sand and gravel, which overspreads all the states to the N., enters Pennsylvania at its N. corner, and is represented by a thin sheet of gravel, which dwindles away within 30 or 40 m. of the New York state line, except where it is traced down the valley of the Delaware at the E. and the branches of the Ohio at the W. Along the middle portion of the N. boundary of the state the height of the table-land appears to have been sufficient to arrest the current by which this formation was deposited, for its bowlders and gravel are rarely detected in this portion of the state. The gneissic rocks, and the middle secondary red sandstone that lies within an elongated basin of the former more ancient group, are limited to the S. E. counties of the state, the gneiss occupying a margin of varying width along the Delaware below Trenton, at Philadelphia reaching up the Schuylkill about 10 m., and giving place on the N. W. to a narrow belt of metamorphic limestones, slates, and quartz rock, which separates it from the red sandstone. This belt contains the quarries of white marble that have supplied with this material the city of Philadelphia and the towns around. To the N. and N. W. of it the gneiss appears again and overspreads the N. part of Chester co., reaching to the red sandstone formation, along the line of which, near Phœnixville, are the mines of lead and copper, of which some account is given in the article LEAD. On the range of the gneiss toward the S. W. is the mine in Lancaster co. which supplies the nickel to the U. S. mint for the new cent, and more of the metal also for exportation. Along the line of the gneiss and sandstone W. of Phœnixville are the Warwick and other mines of magnetic iron ore. South from Philadelphia the gneiss continues round the border of the state, the edge of this formation N. of the Maryland state line coming to a point before reaching the Susquehanna river. In this region, near the Octarara creek, are tracts of serpentine rocks, forming what are called the "serpentine barrens." In these rocks beds of chrome iron ore have been worked to a considerable extent, and at times with great profit, affording large quantities of the ore for the manufacture of chrome paints at Baltimore and for the English market. Trap dikes are of frequent occurrence, not only over the gneiss region, but over all the district of the metamorphic slates, limestones, and quartz rock, and the unaltered lower silurian formations into which these pass. Nearly the whole of Chester and Lancaster cos. are occupied by these groups, and to the N. W. of the red sandstone tracts they are met with again in Berks and Lehigh cos., ranging with the South mountain and coming out on the Delaware at the mouth of the Lehigh, and thence to the bend of the river below Durham. The lower silurian formations contain the great deposits of hematite iron ore, as the Chestnut hill mines near Columbia in Lancaster co., and the numerous beds in Berks and Lehigh cos. which form the chief dependence of the blast furnaces on the Schuylkill and the Lehigh rivers. (See APPALACHIAN MOUNTAINS, HEMATITE, and IRON.) Magnetic iron ores also occur in the same geological position in numerous localities. The Cornwall mine in Lebanon co., situated in the Potsdam sandstone close to the S. line of the red sandstone tract, is one of the most important mines of this ore in the United States.—The red sandstone formation is a continuation of the same group that crosses New Jersey and Maryland. Its N. line, ranging with the Musconetcong creek in New Jersey, crosses the Delaware river below Durham, and extending in a W. direction crosses the Schuylkill 2 m. below Reading and the Susquehanna 5 m. below Harrisburg. It then inclines more to the S. and crosses the S. line of the state near the S. W. corner of Adams co. The S. line of the same belt enters the state opposite Trenton and pursues a general W. course, passing the Schuylkill 2 m. below Norristown, the Susquehanna in the W. corner of Lancaster co., and the state line in Adams co. near the S. E. corner. The tract thus included is occupied almost exclusively by the red sandstones, red shales, and conglomerates of this formation, and by the numerous dikes of trap rock, many of which are of enormous dimensions, and are traced for miles in different directions. It is remarkable that the dip of the sedimentary rocks is not disturbed by these dikes from the uniform inclination of the strata at angles varying from 15° to 20° toward the N., and thence to N. W. The sandstones afford some good building stones, of which there are quarries on the Schuylkill and the Delaware. Next to this belt and the metamorphic rocks, which bound it on the N. and W., lie the lower silurian sandstones and limestones, which are at the base of the long series of palæozoic formations that occupy all the remaining portion of the state. The divisions of this series are given in the article GEOLOGY, vol. viii. p. 157; and they amount in aggregate thickness to over 85,000 feet. The lower members lie along the N. side of the South mountain and the W. side of the continuation of the same range in the S. part of the state, and dipping N. and W. they pass beneath the "auroral" magnesian limestones of the Kittatinny valley. These limestones, corresponding to the Chazy, birdseye, and Black river limestones of New York, fill the whole broad valley between the Kittatinny and Blue mountains on one side and the South mountain on the other. (See APPALACHIAN MOUNTAINS.) Their range is marked by soil of great fertility, and the finest agricultural region of the state is this great limestone valley, occupying the chief portion of Northampton, Lehigh, Berks, Cumberland, and Franklin cos. Beyond this to the N. and W. is a wide belt of country, reaching to the main Alleghany mountains, singularly picturesque, and strongly marked by its peculiar geological and topographical features. Long narrow ridges parallel to each other, after running many miles in straight lines and then curving together, and varied by the occasional termination of one of them upon the plain of the valleys that lie between them, are everywhere encountered over this region of middle Pennsylvania. The rivers and the roads follow the long lines of the valleys, finding a passage across from one to another by the occasional gaps and ends of the ridges. The great pile of the palæozoic formations, raised and crumpled in long folds, the bearing of which is with the mountain ranges, presents its various members in regular succession; and each one of these along the line of its outcrop impresses its peculiar form of outline upon the surface. When the limestone belts, by reason of their enormous thickness or by their changing dips, are spread over a wide area, this is a valley between the steep ridges, in which the sandstones, that have more stoutly resisted the denuding action, form bold cliffs and give a sharp outline to the ridges. As these formations are continually repeated in approaching the main Alleghany mountains, the result is the succession of ridges and valleys, in each of which the geological formations are instantly recognized by the surface contour. The chief minerals of importance in this series of formations below the coal measures are the iron ores, of which mention has been made in the article IRON. In a few districts E. of the Alleghanies the coal measures appear sometimes only over a very limited area upon the summits of the highest ridges, and with no great depth of the formation; and at others forming elongated basins or troughs, as those of the anthracite region of N. E. Pennsylvania, in which the strata curve upward on each side, giving place to the underlying formations outside of the basins. Within each basin these strata present frequent changes of dip, the successive anticlinal and synclinal axes lying nearly on the general range of the basin, and the flexures being often sharp. The character of the formation and the annual product of the coal to the close of the year 1856 are described in the article ANTHRACITE. Since that time the production of the different districts has been as follows, the aggregate, as given in the table, including the production of a few unimportant localities not particularly named. The figures represent tons:

Years.	Schuylkill Region.				[illegible] Anthracite Region.		
	By canal.	By railroad.	Pine Grove.	Little Schuylkill	Shamokin.	Lykens Valley.	Trevorton.
1857	1,375,989	1,472,544	208,500	360,049	150,540	121,650	108,731
1858	1,325,504	1,582,692	233,500	326,796	187,000	137,770	148,696
1859	1,371,738	1,063,150	165,000	362,192	180,000	109,250	124,950
1860	1,266,899	1,678,067	145,636	317,094	211,000	176,250	98,518

Years.	Northern or Wyoming Coal Field.				Lehigh Region.		Aggregate.
	Delaware and Hudson Canal co.	Pennsylvania Coal co.	By canal.	Delaware, Lackawanna, and Wyoming railroad.	By canal.	By railroad.	
1857	480,677	542,575	405,919	490,925	900,314	413,296	6,764,567
1858	348,738	690,868	528,086	690,260	916,508	471,129	7,002,990
1859	590,165	894,285	457,044	820,000	1,450,882	577,683	7,685,500
1860	499,369	881,469	460,943	1,077,500	1,181,022	790,842	8,426,098

The summit of the Alleghanies in Pennsylvania is the E. margin of the great bituminous coal field. The highest points are capped by the conglomerate which underlies the coal formation, or by the lower members of this series, and the strata dipping gently toward the W., the formation gains in thickness in that direction, overspreading nearly the whole western part of the state, except the N. W. corner. No means are afforded of estimating the amount of coal produced, as the mining operations are not concentrated at a few points, but are carried on everywhere, and more for local purposes than for transportation to market over railroads and canals. From Westmoreland co. an amount estimated at 100,000 tons per annum is sent to Philadelphia for manufacturing gas. The subject is further treated in the article COAL. The other useful mineral beds found interstratified with the coal are fire clay, limestone, iron ore, and sandstone. All these occur over the whole range of the formation, the iron ores abounding especially in the lower part of the measures, which brings them to the surface near the margin of the coal field. For the statistics of the production of this metal, see IRON. Salt is obtained by boring through the coal formation of the western portion of the state, and this business is extensively carried on in the valley of the Kiskiminetas. The annual product of salt is estimated at about 1,000,000 bushels. Rock oil or petroleum has recently been obtained in large quantities, associated with the salt in the N. W. part of the state, for an account of which see PETROLEUM. Among the mineral springs those of Bedford are the most celebrated.—The soil of the state is generally rich, that of Lancaster co. on the limestone in the S. E., and of some of the counties bordering the Ohio river and also underlaid with limestone in the W., being particularly noted for productiveness.

In the S. and E. the abundance of lime constitutes good grain soils generally, and there are none of the thin tertiary sands, or of the weak soils lying on primary rocks, which belong to other states of the seaboard. The mountain valleys of the interior generally contain limestone, which secures good soils. In the N. grazing soils preponderate; these are rich on the upper Susquehanna in the N. E., thin and cold on the highlands of the central counties of the N. border, and again very rich and productive in the N. W. The whole W. border of the state is, like the Ohio valley generally, alike adapted to grain and grazing.—The improved lands of the state reported in 1850 numbered 8,628,619 acres in 127,577 farms, or less than one third the sufrace; the opening of new lands in the N. central counties will have increased the proportion to about one third in 1860. The unimproved land held in farms in 1850 was 6,294,728 acres. Extensive wooded tracts well adapted to agriculture yet remain unoccupied in the N. central counties. In 1850 there were produced in the state 15,867,691 bushels of wheat, 19,835,214 of Indian corn, 21,538,156 of oats, 4,805,160 of rye, 2,192,692 of buckwheat, 165,584 of barley, 55,231 of peas and beans, 5,980,732 of Irish potatoes, 52,172 of sweet potatoes, 178,983 of clover and grass seeds, and 41,728 of flax seed; 1,842,790 tons of hay; 912,651 lbs. of tobacco, 4,481,570 of wool, 39,878,418 of butter, 2,505,034 of cheese, 2,326,425 of maple sugar, 839,509 of beeswax and honey, and 530,307 of flax. The value of live stock was $41,500,053; of slaughtered animals, $8,219,848; of market products, $688,714; of orchard fruits, $723,389; and of household manufactures, $749,132. Establishments for manufacture producing $500 or more in value, yearly, were reported in 1850 to the number of 21,605, employing $94,473,810 capital, and producing goods to the value of $155,044,910. The statistics of the leading classes of manufactures were as follows in 1850:

Establishments.	No.	Capital.	Male hands.	Female hands.	Value of products.
Cotton mills.	208	$4,528,925	8,564	4,009	$5,822,262
Woollen " .	880	8,005,064	8,490	2,236	5,821,866
Pig iron furnaces......	180	8,570,425	9,285	9	6,071,518
Cast iron establishm'ts.	820	8,422,924	4,872	1	5,854,881
Wrought iron estab'm'nts	162	7,828,916	6,591	7	9,224,256
Brew'ries and distilleries.	871	1,719,960	1,092	0	6,548,810
Salt works...	47	168,860	219	0	206,796

The production of pig iron was 285,702 tons in 1850, by the U. S. census. The returns of that census were known to be in error at least for Philadelphia, that city producing much more in manufactures, and having a greater number of establishments, than was then reported.—In foreign commerce Pennsylvania holds the fifth place; but it imports through the port of New York, in the name of and for its merchants alone, large amounts of valuable foreign goods, not included in the official figures below. The value of imported goods in the fiscal year ending June 30, 1859, was $14,520,331; of exports for the same year, $5,875,588. For the calendar year 1860 the total imports were $15,190,755, and the exports, $7,843,510. The shipping employed was as follows in 1860: entrances, 449 American vessels, tonnage 134,820, and 147 foreign, tonnage 36,308; total entered, 596 vessels, 171,128 tons; clearances, 356 American vessels, tonnage 105,127, and 131 foreign, tonnage 127,858; total cleared, 487 vessels, 232,985 tons. The total shipping owned in the state in 1859 was, of registered tonnage, 57,859; of enrolled and licensed, 226,884; total, 284,744. The number of arrivals at the port of Philadelphia in 1860 was, of foreign vessels, 582; vessels from domestic ports (including boats and barges), 37,746; total, 38,328. Vessels built in the state in the year ending June 30, 1859, 108, tonnage 14,476.—The internal trade of Pennsylvania is very great over its railroads and canals. The central railroad conducts the largest trade to and from the western states; the Philadelphia, Wilmington, and Baltimore road to and from the south; the Reading and North Pennsylvania roads carry the northward trade, and the New Jersey roads an immense traffic to and from New York. An extensive canal system also exists, but it has been sold by the state in divisions to various private companies, and is less important now than it was a few years since. The Pennsylvania central railroad is 356 m. long from Philadelphia to Pittsburg, and has a double track for all but 68 m. Beyond Pittsburg, the Pittsburg, Fort Wayne, and Chicago railroad has a length of 50 m. within the state, and the Pittsburg and Steubenville road 30 m. This central line has now 282 m. of canal, purchased from the state, and worked in connection with the railroad by the same company. The Reading railroad has a length of 52 m. from Philadelphia to Reading, from which point it connects with Harrisburg over the Lebanon valley road; with various points of the coal-mining region; with Catawissa, Williamsport, and Elmira, N. Y. The Sunbury and Erie road has a total length of 289 m., of which 80 m. are yet unfinished. The total length of railroads in operation in the state in 1860 was 2,943 m.; their total cost was $151,530,000. The total length of canals in use in 1860 was 1,030 m. On the Lehigh, Schuylkill, Delaware, Susquehanna, and Monongahela rivers the canals and slack water navigations convey immense quantities of coal to market, and the railroads in and leading from the coal fields also find their chief freight in coal, both carrying, in the year 1860, over 9,000,000 tons. Great quantities of lumber and timber are transported on the Susquehanna and Alleghany rivers out of the state to market. Western produce is carried most largely by the central railroad; next by the chain of roads in the north, and by the road from Baltimore at the south.—On Nov. 1, 1860, there were 89 banks, the condition of which was as follows:

capital, $25,808,553; loans and discounts, $65,-397,472; stocks, $2,877,774; real estate, $1,-766,255; other investments, $1,045,641; due by other banks, $4,549,999; cash items, $4,-012,286; specie, $7,818,769; circulation, $13,-830,000; deposits, $27,032,104; due to other banks, $4,118,925; other liabilities, $1,072,-150. A free banking law was passed in March, 1860. No banks are permitted to issue notes below the denomination of $5. There are also 30 or 40 savings institutions, proper to be ranked as savings banks, not included in the above, and not reporting to the bank department of the state, 16 of which are in Philadelphia.—The government of Pennsylvania is under a state constitution adopted in 1790, previous to which the chief executive office was the president of the executive council. This constitution was amended in 1838, 1850, and 1857. The legislative body consists of a house of representatives of 100 members, chosen annually from single districts; and a senate of not less than one fourth or more than one third this number—now 33 members—elected for 3 years. The executive department consists of a governor elected by the people for 3 years, whose salary is $4,000; an auditor-general and a surveyor-general elected by the people; a secretary of the commonwealth, appointed by the governor; a state treasurer elected by the legislature, &c. The legislature meets and the executive departments report to it on the first Tuesday of January of each year. The judicial department consists of a supreme court of 5 judges elected by the people for terms of 15 years, one in every period of 3 years. These also have jurisdiction in courts of oyer and terminer. There are 25 courts of common pleas for as many districts, in each of which a president judge is elected by the people for 10 years; and one or more associate judges are elected for each county. The judges of common pleas in each county are also justices of oyer and terminer, but may not hold such courts when a judge of the supreme court is in the county. There is a district court for Philadelphia city and county, and one for Allegheny county, which includes Pittsburg. The judges of the supreme court and the president judges of common pleas receive $1,600 annual salary; the judges of the city districts receive $2,000 to $5,000 salary.—The value of real and personal property in Pennsylvania was assessed in 1858 at $559,049,667, on which a tax was paid in 1860 of $1,479,577; the number of persons taxed was 640,176. The public debt of the state, Dec. 1, 1860, was $37,964,609. The total revenues received into the treasury for 1860 were $3,479,257, and the total expenditures of the same year $3,687,147, including a payment of $591,758 on the public debt. The principal revenues of the state are derived from a tax of 2½ mills on $1 of all real and personal estate; from a tax on banks and corporations, yielding in 1860 $302,000; from various business licenses, $370,750; from tax on loans, $1[illegible]; from interest on loans by the state, $414,[illegible]; from collateral inheritance tax, $146,047; from sale of public works, $100,000, &c. The chief expenditures in 1860 were: for interest and principal of the public debt, $2,614,080; for expenses of the state government, $401,863; for common schools, $282,952; for charitable institutions, $128,320; for houses of refuge and penitentiaries, $38,449; for abatement of the state tax, $52,265. Balance in the state treasury, Dec. 1, 1860, $722,405.—The charitable and penal or reformatory institutions of the state are to some extent blended, but a number of very important charitable institutions exist, founded and supported wholly by private contributions. There are two great penitentiaries, one at Pittsburg and one at Philadelphia, both originally organized on the system of solitary confinement, and still so maintained. This has been called the Pennsylvania system, which is asserted to work well, though when tried elsewhere it has in some cases been reported as too severe. The constant visits and efforts of the prison discipline society have here a favorable influence on convicts, relieving the severity of what would otherwise be absolutely solitary confinement. The eastern penitentiary, on Jan. 1, 1861, contained 464 convicts, and the western about 400. A house of refuge for juvenile delinquents exists in Philadelphia and one in Pittsburg, supported by the state, and one for adults has been authorized to be built at Philadelphia. There is a state lunatic asylum at Harrisburg, which has 200 patients; a hospital for the insane at Pittsburg; an asylum for the deaf and dumb, which has 215 patients; and an institution for the blind with 165 patients. These are all supported in greater part by the state, and the last two are situated in Philadelphia. There is also an institution supported in part by the state for the training of feeble-minded children, near Philadelphia. Among the many charitable institutions supported by private endowment, the Pennsylvania hospital, and its insane department, both in Philadelphia, and the Girard college for orphans, are the most conspicuous. (See PHILADELPHIA.)—A liberal common school system was adopted in 1838, under which the counties had power to establish free or partially free schools as each should choose, support being given by the state only to those counties which should tax themselves for the support of schools. The greater number of counties at once accepted the act, and organized schools under it; but a few neglecting to do so, the legislature in 1854 directed the maintenance of free schools in the entire state, and the assessment of the requisite tax in the counties, $200,000 or more being annually appropriated by the state from its general revenues. This system is now in successful operation, and very effectively directed by state and county superintendents, who report annually. The common schools in 1860 numbered 11,677, educasive of Philadelphia, in which there were 335 public schools. The number of pupils who attended public schools in the whole state was 647,414. The number of teachers was 14,065, of whom, out of Philadephia, 8,171 were male and 4,832 female teachers. The cost of the whole system for 1860 was $2,619,377, of which sum $280,000 was appropriated from the state treasury, and the remainder assessed by tax in the country districts and cities. The average term of all schools out of Philadelphia was 5 months and 5¼ days, and the average cost for each pupil 56 cts. In Philadelphia the schools are wholly free; and in the country the state and county appropriations in most cases render tuition free. The state and county superintendence cost $45,000; and two state normal schools are supported at a cost of $30,000. A system of academies was organized and endowed some years since, one in each county; but many of these, with their endowment, have been merged in colleges or common schools. Only 20, with 1,343 students, were in operation in 1860. There are 26 colleges, but one of which receives aid from the state; of these, 9 are literary, 7 theological, 8 medical, 1 law, and 1 agricultural. The aggregate number of students is about 2,500, of whom 1,250 attend the medical schools. These last are the most celebrated and successful of their class in the country. The medical department of Pennsylvania university was founded in 1765, and Jefferson medical college in 1824. Of the adult population in 1850, 51,283 of native birth and 24,989 of foreign birth could not read and write.—The number of churches in the state reported in the census of 1850 was 3,566, of capacity to accommodate 1,574,873 persons, and valued, with other church property, at $11,586,115. The number of Methodist churches was 889, Presbyterian 775, Lutheran 498, Baptist 320, German Reformed 209, Friends' 142, Episcopal 136, Roman Catholic 139, Mennonite 92, and Moravian 84.—The number of libraries in the state in 1850 was 393, containing altogether 363,000 volumes. Of these, 90 were public libraries, with 184,666 volumes; 30 school libraries, with 17,161; 226 Sunday school, with 58,071; 21 college, with 77,050; and 26 church libraries, with 26,452. A large increase in the number both of libraries and volumes has occurred since 1850. In the same year there were 310 newspapers and periodicals, of which 71 were literary and miscellaneous, 198 political, 28 religious, and 12 neutral and independent; 24 were issued daily, 261 weekly, 19 semi-monthly, &c. The circulation of numbers, as issued daily, weekly, and otherwise, was 983,218; and the total number of copies annually printed was 84,898,672. The present actual number of daily journals is 27, and the issue of other papers and periodicals has greatly increased.—The Delaware bay and river received its first civilized colony from Sweden. An extensive scheme of colonization for the new world was projected in Sweden under very high auspices, nearly at the same time that the New England colonies were sent out, and a few years previous to Calvert's colonization of Maryland. In 1627 a well provided body of Swedes and Finns settled on both shores of the Delaware, making their way nearly to the site of Philadelphia. They made little progress in the occupation of the country, were compelled to submit to the then flourishing Dutch rule at New Amsterdam in 1655, and passed without resistance under the English jurisdiction generally established in 1664. In 1681 the territory west of the Delaware was granted to William Penn, who colonized it, and founded Philadelphia in 1682. Under the charter granted to Penn by Charles II. the present area of the state of Delaware was included, and called the lower counties; and they continued under the same proprietary until 1699, when a separate legislature was granted them, but not a distinct government. The two colonies were so connected until the revolution of 1776. The grant to Penn was for territory really covered by the vague grants made to the New England colonies, Virginia, and Maryland; and though the lines on the E., N., and W. were adjusted without difficulty, the boundary between Pennsylvania and Maryland was long a subject of contest by the heirs of the original proprietors, and it was finally settled by the survey of Mason and Dixon, begun in 1763 and completed in 1767. (See MASON AND DIXON'S LINE.) The original Swedish colony was unusually free from trouble with the Indians, and after Penn's colony was founded a remarkable and most successful peaceful policy was inaugurated with the savage tribes in contact with the colony. Impressing them by acts of justice, firmness, and good faith, Penn secured for his successors uninterrupted peace with the Indians until the opening of the revolutionary war. The disastrous expedition of Braddock and the massacre of Wyoming proved, however, that the character of the Indians was the same here as elsewhere. The settlers of the lower counties were, after the Swedes, originally mainly Friends. Their high character and steady energy made this one of the most flourishing colonial establishments, if not, all things considered, quite the most successful. It became the seat of learning, wealth, and refinement long before the revolution, and continued to enjoy a high position throughout the changes incident to the founding of a new government. Its central position drew to it the sessions of the continental congress, and it was the seat of the general government then formed until 1800. Independence was proclaimed here, and the whole colony took a decided, yet not a violent or embittered part in the war of the revolution; Brandywine, Germantown, Valley Forge, and other points becoming sacred to the whole nation for memorable events. The first large accession to the population, next to the Friends, was from a German immigration begun about 1750, which prised several counties adjacent to Philadelphia, and has given prominence to that nationality in all the subsequent history of the state. There was a considerable immigration of Scotch [illegible], but coming immediately from the N. of Ireland, which was diffused largely over all the state. Since these events the usual interchange [illegible] constantly going on in American [illegible] has occurred, and Pennsylvania has contributed very largely to the settlement of all the new western states.

PENNY, an English coin of the value of $\frac{1}{12}$ of a shilling. The Saxons introduced it and made it of silver, weighing about 22½ grains, or $\frac{1}{240}$ of the pound. It was divided by a deeply indented cross into 4 quarters, which might be separated by breaking them apart; hence the introduction of the fractional terms halfpenny and farthings (four things). Its weight was reduced by Edward I. to $\frac{1}{20}$ of an ounce, and in the reign of Elizabeth its value was fixed at that of $\frac{1}{62}$ of an ounce, which it still retains. It has long been coined in copper; but on account of the inconvenient size of the copper pennies, a new bronze coinage has been determined on in England, and is now [illegible] executing at Birmingham.

PENNYROYAL (*mentha pulegium*, Linn.), a European species of mint, of smaller size than any of the other species, and of which the entire plant except the root is considered medicinal. Its stems are prostrate; its leaves elliptical, obtuse, nearly entire; its flowers borne in rotating verticillate, sessile spikes from the axils of the leaves; calyx smooth at base and closed by a ring of hairs when in fruit; corolla purple. The plant smells like spearmint, but less fragrant, and has a bitterish and aromatic taste; it yields a very volatile essential oil, which rises at distillation in water. It had much repute at one time as an emmenagogue, expectorant, and diaphoretic, acting on the uterus, and [illegible] hysteria, whooping cough, and asthma. It occurs in moist places, heaths, and [illegible].—The American pennyroyal (*hedeoma pulegioides*, Persoon) is a warm-tasted, aromatic little herb, with nearly the same flavor and odor as the true pennyroyal. It grows in [illegible] barren woods, or on sunny hills among stones, and in fields. Its stem is 6 to 12 inches [illegible], erect, branching, and hairy; its leaves [illegible], oblong-ovate, obscurely serrate; its [illegible] few-flowered; corolla bluish pubescent, [illegible] much longer than the calyx; fertile stamens [illegible], the other 2 reduced to abortive filaments. [illegible] popular medicine it is held in much esteem [illegible] account of its diaphoretic and carminative [illegible].

PENNYWEIGHT, a weight of 24 grains, which was that of the silver penny in the time of Edward I. This has ever since continued one of the units of troy weight, being equal to $\frac{1}{20}$ of the ounce troy.

PENOBSCOT, a central co. of Me., intersected by the Penobscot river; area, 2,760 sq. m.; pop. in 1860, 72,731. It has a diversified surface and a generally fertile soil. Formerly it comprised a very large territory, which has been gradually cut up to form other counties, and its outlines are very eccentric, being composed of 3 parallelograms irregularly disposed. The productions in 1850 were [illegible] bushels of Indian corn, [illegible] of oats, [illegible] of potatoes, [illegible] of wheat, [illegible] tons of hay, [illegible] lbs. of wool, and [illegible] of butter. There were 7 grist, 2 paper, and 100 saw mills, 2 founderies, 12 tanneries, 1 ship yard, 6 newspaper offices, 65 churches, and [illegible] pupils attending public schools. Capital, Bangor.

PENOBSCOT, the principal river of Maine, formed by the junction, near the centre of the state, in the E. part of Penobscot co., of two chief branches. The W. and larger rises near the Canada border, flows N. E. to Chesuncook lake, from the S. end of which it issues, and after a S. E. course of about 30 m. enters a group of ponds or lakes, Pemadumcook, Millinoket, Twin lakes, and others, issuing from them in two channels, which unite after a short distance. The E. branch, also called Seboois river, proceeds from a number of small lakes in the N. part of Penobscot co., and has a nearly S. direction. The main stream pursues a course a little W. of S., receiving among its most important affluents the Piscataquis on the W. and the Mattawamkeag and Passadumkeag on the E., and falls into Penobscot bay. Its total length, from the source of the W. branch, is about 275 m., and from the junction about 135 m. The principal towns on its banks are Castine, Bucksport, and Orrington on the E., and Belfast, Prospect, Frankfort, Hampden, and Bangor on the W., to the last of which, about 50 m. from its mouth, it is navigable for vessels of large size. Along its course it has numerous falls, affording valuable water power. At Bangor there is a tide of about 20 feet produced by the peculiar wedge-like shape of the lower part of the river.

PENOBSCOT BAY, a body of water on the S. coast of Maine, into which flows the Penobscot river. It is about 30 m. in length, and contains a number of small islands.

PENSACOLA, a city and the principal seaport of West Florida, capital of Escambia co., situated on the N. W. side of the bay of the same name, about 10 m. from its mouth, in lat. 30° 24′ N., long. 87° 10′ W.; pop. about 4,000. The country immediately around Pensacola is barren and sandy, but little cultivated, and covered for the most part with pines. The town itself, although a place of considerable political and commercial importance during the Spanish and English occupation, had until within a year or two past presented rather a decayed appearance, the houses being generally old-fashioned Spanish structures, the streets unpaved, many of them with only wooden sidewalks, and but little appearance of business activity to be observed. Of late there has been a large accession both to its trade and population, in consequence of the approach to completion of the Alabama and Florida railroad, connecting it with Montgomery; and it now bids fair to become one of the most important points in the gulf of Mexico. It has a very admirable harbor, admitting vessels of a draught of 21 feet, and affording almost unlimited accommodation. The principal public buildings are a custom house, Roman Catholic, Episcopalian, Presbyterian, Methodist, and Baptist churches, and an academy. A tri-weekly and two daily newspapers are published. The remains of the old Spanish forts, San Miguel and San Bernard, may be seen in the rear of the city. The city is supplied with water of excellent quality from a number of springs. The climate is exceedingly healthful, except for occasional and rare visitations of yellow fever. The creole element predominates in the resident population, a corrupt *patois* of the French language is extensively spoken, and many of the usages and customs prevailing are quaint and primitive.—There is some uncertainty with regard to the original settlement of Pensacola. It is believed that a few French colonists established themselves here about the year 1696. There is no doubt, however, that the place was in the possession of the Spaniards in 1699, about which time a colony of 300 emigrated thither from Vera Cruz. Their possession was for many years disputed by the French, and in 1719 the place was attacked and taken possession of by Bienville, who held it until 1723, when it was restored to the Spaniards. In 1763 Pensacola, with the rest of Florida, passed into the occupancy of the British. It was again besieged and taken by the Spanish general Galvez in 1781; and in 1783 the whole province was retroceded to Spain. In Nov. 1814, the British forces, which had been permitted by the Spanish authorities to establish themselves at Pensacola, were driven out by Gen. Jackson, who assaulted and took the city and adjacent forts. In May, 1818, Gen. Jackson again took possession of Pensacola, and obliged Fort Barrancas, to which the Spanish governor had retired, to capitulate. This movement was made in consequence of the incursions of hostile Indians from Florida into United States territory, and the inability or unwillingness of the Spanish authorities to suppress them. By a treaty concluded Oct. 24, 1820, and ratified March 22, 1821, the whole province was ceded to the United States. On Jan. 12, 1861, immediately after Florida had declared its secession from the Union, a body of about 500 troops, volunteers from Alabama and Florida, commanded by Col. W. H. Chase, took possession of the navy yard, Forts Barrancas and McRea, the naval hospital, and military barracks, all near the entrance of the harbor. Lieut. Slemmer, of the U. S. army, had two days previously evacuated Fort Barrancas and transferred his command to Fort Pickens, immediately opposite, on Santa Rosa island. The relative position of both sides continued the same until the middle of April, when Fort Pickens was reinforced by about 1,000 U. S. troops under command of Lieut. Col. H. Brown. Col. Chase had previously been superseded by Gen. Bragg, who now (May 15, 1861) invests the fort with from 7,000 to 10,000 men.

PENSACOLA BAY, an arm of the gulf of Mexico, in the western part of Florida, extending inland about 25 or 30 m. in a N. E. direction. At a little more than half this distance from the sea, it separates itself into two divisions, Escambia bay on the W. and on the E. the bay of Santa Maria de Galvez, East bay, or Black Water bay, as it is variously designated. The former receives the waters of the Escambia river; the latter, those of the Black Water and Yellow Water. The entrance of the bay, between Santa Rosa island on the E. and the mainland on the W., is little more than 1 m. wide, but within it expands into a capacious harbor, from 4 to 10 m. in width, and entirely landlocked. There is a depth of about 22 feet of water on the bar. The entrance of Pensacola bay is defended by Fort Pickens on the E., situated on the extreme point of the long, narrow island of Santa Rosa, and Fort McRea on the W., situated on the mainland. About 1½ m. to the N. and immediately in front of the entrance (the W. shore making an abrupt turn to the E.), stands Fort San Carlos de Barrancas. Near this fort are the lighthouse, extensive barracks, and the naval hospital. About a mile above the hospital is the navy yard, situated on Tartar point, where the shore again bends to the N. The villages of Warrington and Woolsey lie immediately adjacent to the wall of the navy yard. Six miles above is the town of Pensacola. At the mouth of Blackwater river is the village of Bagdad, where there are extensive saw mills, sash manufactories, &c. Milton, a thriving village of about 1,200 inhabitants, is 3 m. above. There is a large lumber trade on the shores of Pensacola bay and its tributaries.

PENSIONARY, GRAND, an officer of the Dutch republic, who bore the title also of advocate-general, and was prime minister of the states or legislative body of the province of Holland. He was called grand pensionary from the pension or salary attached to his office. In the assembly of the states he initiated bills, drew up reports, and collected the votes. He also conducted the diplomatic correspondence of the province, received ambassadors, and superintended the finances. He permanently represented the province in the states of the United Provinces, and had great influence not only in the province of Holland, but in the whole republic. The term of his office was 5 years with privilege of reëlection. The most distinguished of the grand pensionaries were John De Witt, killed in 1672, Heinsius, who was in office from 1689 to 1720, and Schimmelpenninck, who was grand pensionary of the Batavian republic from 1798 to 1806, when the office was abolished.

PENTAMETER (Gr. *πέντε*, five, and *μέτρον*, measure), a verse consisting of 5 feet, of which the 1st and 2d are either dactyls or spondees, the 3d always a spondee, and the 4th and 5th anapæsts. Elegiac verses consist of hexameters and pentameters used alternately.

PENTATEUCH (Gr. *πέντε*, five, and *τεῦχος*, book), the 5 books of Moses, being the first 5 books of the Old Testament, viz.: Genesis, Exodus, Leviticus, Numbers, and Deuteronomy. (See Bible, and Hebrews.)

PENTECOST (Gr. *πεντηκοστή*, fiftieth), one of the 3 principal festivals of the Jews, so called in Greek and modern languages because it was celebrated on the 50th day after the feast of the passover, but originally called the "*feast of weeks*" (Heb. *hag hashabuoth*; in the book of Tobit, *ἁγία ἑπτὰ ἑβδομάδων*, the feast of 7 weeks), because it was celebrated 7 weeks after the 16th day of the 1st month of the Mosaic calendar (Nisan). It was and is still observed by the Jews (now generally also on the day following the 50th) as a day of public rejoicing, and also in commemoration of the revelation of the law on Sinai, which happened on the same day.—The day is also kept as a high festival in the Christian church to commemorate the descent of the Holy Ghost upon the apostles, 10 days after Christ's ascension and the commencement of the preaching of the gospel to the gentiles. The apostles, the women, and others, to the number in all of about 120, being gathered together at Jerusalem on the day of Pentecost, "suddenly there came a sound from heaven as of a rushing mighty wind, and it filled all the house where they were sitting. And there appeared unto them cloven tongues like as of fire, and it sat upon each of them. And they were all filled with the Holy Ghost, and began to speak with other tongues as the Spirit gave them utterance. . . . . Now when this was noised abroad, the multitude came together, and were confounded, because that every man heard them speak in his own language." (Acts ii. 2-6.) It is further related that Peter thereupon preached to them, and about 3,000 souls were converted. The precise nature of the gift of tongues, as the power then conferred by the Holy Ghost is generally called, is very variously explained by commentators. Some believe that the apostles were miraculously enabled to speak all languages without having learned them; others suppose the speaking with tongues to have been merely a convulsive sort of utterance followed by intelligible and inspired words. Other critics hold that the speakers used either their own native languages, or an ecstatic tongue which by a miracle sounded to each hearer as if it were his own dialect. A synopsis of the different opinions is given by De Wette. The festival of Pentecost was in the early ages one of the favorite seasons for administering baptism; and as those who received it were clothed in white to symbolize the spiritual purity which baptism confers, the day acquired the name of Whitsunday or Whitsuntide.

PENZA, a central government of European Russia, situated between lat. 52° and 55° N. and long. 42° and 47° E., and bounded N. by Nijni Novgorod, E. by Simbirsk, S. by Saratov, and W. by Tambov; area, 14,840 sq. m.; pop. in 1856, 1,125,967. The surface is level. There are 6 small lakes, and several streams; but the only rivers of any importance are the Sura and the Moksha, both tributaries of the Volga. Valuable iron mines are worked near Troitsk, millstones are extensively quarried, and large quantities of sulphur are found. The cold in winter is very severe, but the summer is mild, and the climate generally healthy. More than half the surface is arable or meadow land, and there are extensive forests. Great attention is paid to raising horses, horned cattle, sheep, pigs, and bees. There are iron works, glass works, tanneries, &c.—Penza, the capital, is situated at the junction of the rivers Penza and Sura, 465 m. S. E. from Moscow; pop. about 12,000. It stands on an eminence, and is built principally of wood. There are manufactories of woollen fabrics, linen, leather, soap, and silk. An annual fair is held, which lasts from June 25 to July 4.

PENZANCE, a seaport and the most westerly town of England, on Mount's bay, Cornwall, 24 m. S. W. of Truro and 9 m. E. N. E. of Land's End; pop. in 1861, 9,214. The situation of the town is exceedingly picturesque, standing on a beautiful shore finely curved, and surrounded by rocky eminences. It has several churches and public buildings, the hall and museum of the Cornwall geological society, and a pier of considerable length with a lighthouse at its extremity. Tin and copper, which abound in the neighborhood, are exported in large quantities, as well as china clay and pilchards. The climate is remarkably mild, and numerous invalids resort thither. Sir Humphry Davy was a native of Penzance.

PEON, a Spanish word signifying a day laborer. In Spanish America it is applied especially to Indian laborers. By the civil law under the Spanish colonial system, and by special statute in some countries, as for instance by the law regulating contracts between masters and servants in New Mexico, peons are compelled to work for their employers, provided they are in debt to the latter, until the debt is paid. They receive wages, amounting in New Mexico to $5 a month. It is alleged that many proprietors, by enticing the peons in their employment into needless expenditures, and by selling them goods and advancing them money, contrive to keep them hopelessly in debt and in a consequent state of bondage. The creditor, however, has no power over the wife and children of the peon, nor can the latter be sold like a slave.

PEORIA, a central co. of Ill., bounded S. E. by the Illinois river and Peoria lake, and drained by Spoon river, Kickapoo, Elbow, and

Copperas creeks; area, 650 sq. m.; pop. in 1850, 17,547; in 1860, 36,945. It has a gently undulating surface and very fertile soil. The productions in 1850 were 1,013,289 bushels of Indian corn, 185,157 of wheat, 138,718 of oats, 12,553 tons of hay, and 40,225 lbs. of wool. In 1860 there were 10 grist mills, 15 saw mills, 3 tanneries, 6 newspaper offices, 72 churches, and 7,941 pupils attending public schools.—PEORIA, the capital, is situated on the W. bank of the Illinois river, here crossed by 2 bridges, each 2,500 feet long, at the outlet of Peoria lake, 70 m. N. from Springfield, and 160 m. by railroad S. W. from Chicago; pop. in 1860, 14,762. It has regular river communication by steamboat with St. Louis, and is connected with Chicago by the Illinois and Michigan canal. The Peoria and Bureau Valley, the Logansport and Peoria, and the Peoria, Oquawka, and Burlington railroads, which concentrate in the city, unite with the principal railroads of the state. It is a city and port of entry, well built, regularly laid out, with wide pleasant streets lighted with gas, and contains, beside the county buildings, several educational institutions, and 24 churches. The products of manufacture in 1860 amounted to $6,717,000. The neighboring bluffs contain inexhaustible beds of coal, and excellent timber also abounds in the vicinity, giving rise to a very extensive trade.

PEPIN OF HÉRISTAL, duke of the Franks, born about the middle of the 7th century, died in 714. He was the grandson of Pepin of Landen and the founder of the Carlovingian family. Inheriting part of the influence of his ancestors, who held the highest rank among the *leudes* or lords of Austrasia, Pepin, in concert with his cousin Martin, the mayor of the palace, led the rebellion against King Dagobert II., who was murdered in 679. The two chiefs then received the title of "dukes of the Franks," and the kingly title in Austrasia was abolished. They attempted to subdue Neustria, which was then ruled by the mayor Ebroin, but were defeated at Leucofao near Laon in 680, when Martin was killed and Pepin remained the only chief of the Austrasians. Occasional hostilities took place during the following years, without any marked success; but Pepin did not give up his ambitious designs, and in 687, having routed the Germans, he was enabled to invade Neustria at the head of a formidable army. The contest ended in the battle of Testry, when Roman France, as northern Gaul was called, succumbed to Teutonic France; and thenceforth the duke was the acknowledged ruler of the whole Frankish empire. He nevertheless permitted Merovingian princes to continue upon the throne; but Thierry III., Clovis III., Childebert III., and Dagobert III. were mere phantoms whom he kept under guard in some villa, bringing them forth but once a year in the national meeting of May, while he wielded unlimited authority, controlling the aristocracy of the chiefs as he did royalty. From 687 to 712 he was engaged in wars against the hostile tribes on the banks of the Rhine, and especially the Frisians and the Alemanni. After repeated defeats, both were subdued. But the latter days of Pepin were troubled by the rivalry between his legitimate wife Plectruda and his mistress Alpaida, the mother of Charles Martel. His own son Grimoald was murdered; and he bequeathed to his grandson under the regency of his widow a power which was soon seized upon by his natural son, whom he had imprisoned.

PEPIN THE SHORT (*le Bref*), king of the Franks, the first of the Carlovingian dynasty, born about 715, died in 768. On the death of his father Charles Martel in 741, he received as his share of the Frankish empire Neustria, Burgundy, and Provence, while his elder brother Carloman had Austrasia and the countries on the right bank of the Rhine. To strengthen his power, he placed on the throne a Merovingian prince, Childeric III., and contented himself with the title of mayor of the palace. In concert with Carloman, he forced the Bavarians, the Alemanni, and the Aquitanians into submission; but Carloman having in 747 retired to a convent, Pepin, setting the just claims of his nephews aside, made himself the ruler of the whole Frankish dominions. He now thought the time had come to add the title of king to his authority; in consequence of which, availing himself of a favorable decision of Pope Zachary and the consent of the lords, he confined Childeric III. in the monastery of Sithin, near St. Omer, and was solemnly crowned and anointed by St. Boniface at Soissons in 752. In the same year he received the submission of Septimania, which for several years had been held by the Saracens of Spain. In 753 he forced the Saxons to recognize his supremacy by paying a tribute of 300 horses and taking an oath to respect the Christian missionaries travelling among them. Pope Stephen III. now visited France to solicit assistance against the persecutions of Astolphus, king of the Lombards. Pepin received the pontiff with great honor, had the ceremony of coronation performed again by him, and started for Italy at the head of his army. He crossed the Alps and besieged Astolphus in Pavia, who sued for peace and assented to the terms dictated by his conqueror; but Pepin had scarcely left Italy, when Astolphus broke the treaty and threatened the city of Rome. Pepin hastened to the rescue (755), conquered the exarchate of Ravenna, and gave it, with the Pentapolis, to the pope, thus founding the temporal sovereignty of the holy see. In 759 he invaded Aquitania, which, under the heroic Waifar, had asserted its independence. A dreadful war of 8 years was waged, and the king of the Franks could only secure his conquest of that province by the assassination of his rival (768). Pepin died a few days after his return from his last expedition thither, leaving his kingdom to his two sons, Carloman and Carl, the latter of whom was afterward known as Charlemagne.

Notwithstanding his shortness of stature, from which his surname was derived, Pepin was noted for extraordinary physical strength; and this, with courage and activity, secured his influence over the turbulent chieftains of Teutonic France.

PEPIN I., king of Aquitania, born about 802, died in 838. The second son of Louis le Débonnaire by his first wife, he received from him in 817 the kingdom of Aquitania, while his youngest brother Louis had Bavaria, and the eldest, Lothaire, was associated in the government of the empire. In 829, when the emperor wished to change this arrangement in order to provide for Charles, who had been born to him by his second wife, Judith of Bavaria, Pepin joined his brothers in a rebellion against their father, whom they confined in a monastery; but soon becoming dissatisfied with the overbearing manner of Lothaire, who had seized upon the imperial authority, Pepin participated in the national assembly held in 830 at Nimeguen, which restored Louis to his throne. His father now designing to take Aquitania from him, he, in concert with his brothers, flew to arms again in 833; and the three princes marched their troops to Alsace, met the emperor at a place afterward known as Lügenfeld, took him prisoner by means of the treachery of his own troops, conveyed him to Compiègne, and forced him to do solemn penance. But at the end of a few months Pepin and Louis of Bavaria, disgusted once more with their older brother's behavior, released their father from his captivity and again acknowledged his supremacy (834). Pepin was addicted to intemperance.—PEPIN II., his eldest son, bereft of his inheritance, which was granted to Charles the Bald, the youngest son of Louis le Débonnaire, was nevertheless acknowledged as king by the Aquitanians. In 840 he joined his uncle Lothaire in his contest against Charles the Bald and Louis the German, was defeated with him at Fontenay in 841, and once more, by the treaty of Verdun in 843, deprived of his kingdom. He still however held his ground, forced Count William of Toulouse into submission, routed the army of Charles the Bald near Angoulême in 844, and finally in 845 obliged his uncle to grant him the best part of Aquitania as a fief. But his popularity among the Aquitanians vanished when he allied himself with the Northmen. Abandoned both by his subjects and his allies, he took refuge in Gascony, but was betrayed into the hands of Charles the Bald by the Gascon chief Sancho in 852. Imprisoned in a monastery, he escaped in 854, induced a number of Aquitanians to rise in his behalf, again procured the assistance of the Northmen, and in 857 obliged Charles to grant him lands. But in a last attempt to take Toulouse at the head of the Northmen in 864, he fell into an ambush, was sent to Pistes, where he was sentenced to death by the lords of the kingdom, and was imprisoned by his uncle at Senlis, where he died soon after. On account of his alliance with the Northmen, he was styled "the Apostate."

PEPPER, a name applied to a number of pungent-fruited plants belonging to distinct orders. The black pepper (*piper nigrum*, Linn.) is the berry of a climbing vine of the East Indies, very extensively cultivated there. It is the type of the pepperworts (*piperaceæ*, Lindley), which comprise in their several species shrubs and herbs with articulated stems, opposite verticillate leaves, which are sometimes alternate in consequence of the abortion of one of the pairs; stipules none, or in pairs or single, and opposite to the leaf; flowers usually sessile, in spikes either terminal or axillary, naked, having a bract on the outside; the stamens 2 or more, arranged on one side; anthers with 1 or 2 cells; stigmas 3; ovary simple, 1-celled; fruit somewhat fleshy, indehiscent, 1-seeded. Some doubt exists among botanists whether the pepperworts are exogenous or endogenous; the venation of their leaves and the general appearance of the wood favor the former supposition, while observations made by Blume in regard to the spiral vessels seem to indicate that they are endogenous. The black pepper has broad-ovate, acuminate, 7-nerved, coriaceous, smooth leaves, pale beneath and dotted when young; the flowers are situated upon long, pendulous, tapering aments, and succeeded by round fleshy berries. These are gathered after the pepper vine is at least 4 years old, and quickly dried upon mats, when they turn black. In this condition they are termed black pepper, and the white pepper of the shops consists of the same berries freed from the husk or rind by maceration in water. Pepper, though usually employed as a grateful condiment, is likewise prescribed as a medicine in cases of relaxed uvula and paralysis of the tongue, and in the form of an ointment for scald-head. Infused in spirit and water, it has been considered more speedy and milder in its operation as a remedy against the return of a paroxysm of intermitting fever than the cinchona alkalies. Pepper is a dangerous stimulant in excessive doses, being found hurtful to the liver and injurious through its impression on the nervous system. The officinal cubebs (*P. cubeba*, Linn.) and another species (*cubeba canina*, Miquel), both common in Java, are extensively used in medicine. The leaf of the betel, which is chewed with the areca nut, is from the *P. betle* of Miquel. The kava plant is the *macropiper methysticum* (Miquel), whose rootstocks are used by the Society Islanders for purposes of inebriation; its medicinal properties are stimulating, narcotic, sudorific, and aromatic. It has a reputation, as a tincture, against rheumatism. There are many other species in this order which possess useful properties. The African pepper consists of the seeds of the *xylopia aromatica* (Blume), growing in Sierra Leone; and another species of Brazil and Guiana is employed for the same purpose by the negroes of those countries. These plants belong however to the *anonaceæ*. The importations of black pepper into the United States for the year ending June 30, 1859, amounted to 7,091,750 lbs., valued at $401,791, of which $107,413 worth was reëxported.—The peppers of the kitchen garden are the fruits of the capsicums, of the natural order *solanaceæ*. (See Capsicum.)

PEPPERELL, Sir William, an American general, born at Kittery Point, Me., in 1697, died there, July 6, 1759. He was brought up as a merchant. About 1727 he was elected one of his majesty's council for the province of Massachusetts, and he was regularly reëlected for 32 years in succession. Living on an exposed frontier, where the inhabitants were constantly engaged in warfare with the savages, a large portion of his life was spent in the camp. He rose to the highest honors, and when the expedition against Louisburg was undertaken, the governors of New England gave him the command of the troops. Beginning the siege in May, 1745, he soon compelled the city to surrender, and in reward for his services was made a baronet. In 1759 he was appointed lieutenant-general. His grandson was created a baronet in 1774, and embraced the royal cause during the revolutionary war, in consequence of which his estates were confiscated. The life of Gen. Pepperell has been written by Usher Parsons (8vo., Boston, 1855).

PEPPERMINT. See Mint.

PEPSIN. See Chyme.

PEPUSCH, Johann Christoph, a German composer, born in Berlin in 1667, died in London in 1752. For a number of years he held an appointment at the Prussian court as harpsichord teacher, and about 1698 emigrated to England, where he passed the remainder of his life. As a composer he is chiefly known by his adaptations of popular airs for the "Beggar's Opera," for which he also wrote an original overture. He was the author of a "Treatise on Harmony" (1731), highly esteemed as a theoretical work.

PEPYS, Charles Christopher. See Cottenham.

PEPYS, Samuel, an English diarist, born Feb. 23, 1633, died May 26, 1703. He belonged to an ancient family, but his father was a tailor, and his own early life seems to have been passed in humble circumstances. He was educated at St. Paul's school, London, and at Magdalene college, Cambridge, where he held a scholarship, but it does not appear that he took a degree. In 1655 he married a young girl without fortune, and went to live with his cousin, Sir Edward Montagu, afterward first earl of Sandwich, whom he accompanied a few years later on his expedition to the Sound. He was immediately afterward appointed to a small office in the exchequer. On Jan. 1, 1659–'60, he began to keep a short-hand diary, which he continued uninterruptedly until May 31, 1669, when he was compelled by defective eyesight to give it up. Though an ardent roundhead in his youth, he expressed great joy at the restoration of Charles II., and accompanied Montagu in the capacity of secretary to the two generals of the fleet when he brought the king over. In the summer of 1660 he was appointed clerk of the acts of the navy, an office which gave him constant opportunities for intercourse with the duke of York, who held the post of high admiral, and with whom he was soon in great favor. His talents for business were of no common order. During the plague of 1665 he had the whole management of the naval affairs. He was one of the commissioners on the affairs of Tangier in 1662, and became treasurer to the commission in 1665. At the same time he was appointed surveyor-general of the victualling office. When the officers of the navy board were called to the bar of the house of commons in 1668, to answer for the disaster to the British fleet in the Dutch admiral De Ruyter's expedition against Chatham, Pepys was chosen by his colleagues to conduct their defence, which he did in a speech of 3 hours with complete success. His diary contains a curious record of the compliments which were paid him on this occasion: "Mr. Vaughan did protest . . . . that he had sat 26 years in parliament, and never heard such a speech there before; for which the Lord God make me thankful! and that I may make use of it not to pride and vain glory, but that, now I have this esteem, I may do nothing that may lessen it!" Nevertheless, though he was many years in parliament, he made no figure there. Shortly after the close of his diary he travelled on the continent, and collected a variety of information respecting the French and Dutch navies. He was not without his enemies; the earl of Shaftesbury attempted to show that he was "a papist or popishly inclined," with a view to defeat him in a contested election case before a committee of the house of commons, and some years afterward attempted to implicate him in the murder of Sir Edmundbury Godfrey. In 1673 King Charles appointed him secretary for the affairs of the navy—an office which only involved him in fresh difficulties, for during the excitement of the popish plot he was accused with Sir Anthony Deane of sending secret particulars respecting the English navy to the court of France, and of being an enemy to the Protestant religion. After 9 months' imprisonment he was discharged, the complainant, Col. John Scott, a man of bad character, retracting his deposition. Pepys had now lost his office, but in 1680 he attended the king at Newmarket, where he took down in short-hand his majesty's narrative of his escape after the battle of Worcester, which has often been published. In 1683 he accompanied Lord Dartmouth's expedition to Tangier. After his return he was appointed secretary for the affairs of the admiralty, a post which he continued to fill with remarkable ability until the accession of William of Orange, when he retired to private life. He was president of the royal society from 1684 to 1686. In 1690 he was arrested on a charge of being too favorable to the exiled James, but was soon released.—By his will Pepys left to Magdalene college, Cambridge, his valuable collection of prints, books, and manuscripts, now known as the Pepysian library. Among them are manuscripts, naval memoirs, and a collection of English ballads in 5 large folio volumes, from which Bishop Percy partly derived his "Reliques of Ancient English Poetry." His diary, after lying unread for more than a century, was deciphered by a young collegian, Mr. John Smith, and part of it published, with a selection from his private correspondence, by Lord Braybrooke (2 vols. 4to., London, 1825). It has since appeared in several more complete editions, and forms 4 vols. of Bohn's "Historical Library." It is universally regarded as one of the most amusing books of its kind ever printed, and it gives us an insight into the manners and social life of the time of Charles II. which we can obtain by no other means. Pepys published "Memoirs relating to the State of the Royal Navy" (8vo., London, 1690), and a further publication of them is in progress, edited by E. F. Rimbault; and his "Journal of Voyage to and Residence at Tangier" has been published from the MSS. in the Bodleian library (2 vols. 8vo., 1841).

PEPYS, William Haseldine, an English chemist, born in London in 1775, died there, Aug. 17, 1856. Early manifesting a taste for the natural sciences, he became a member of the Askesian society, founded in 1796 for the investigation of philosophical subjects, and contributed a number of papers to its proceedings. Out of this society sprang the London institution for the advancement of literature and the diffusion of useful knowledge, the British mineralogical society, and the geological society of London, in all of which Mr. Pepys took an active part. The progress of chemistry and electro-chemistry was for 50 years materially aided by his skill in the construction of apparatus. A voltaic battery for electro-magnetic experiments devised by him is described in the "Philosophical Transactions" for 1823.

PERA, a suburb of Constantinople. See Constantinople, vol. v. p. 687.

PERAMELES, a family of small marsupial mammals, popularly called bandicoots. The dentition is: incisors $\frac{10}{6}$, canines $\frac{1-1}{1-1}$, premolars $\frac{3-3}{3-3}$, and true molars $\frac{4-4}{4-4}$; the teeth are rooted, the premolars compressed and pointed, and the molars tuberculated. The head is elongated, the face narrow and pointed, muffle naked, nostrils lateral, upper lip slightly cleft, and the ears moderate or very large; the posterior limbs considerably the longest; fore feet 5-toed, with rudimentary outer toes; hind feet with inner toe rudimentary or absent, the 2d and 3d joined even to the end and with small nails, the 4th very large, and the 5th moderate or rudimentary; tail usually short and clothed with small hairs, but sometimes long with very long hairs; pouch with its entrance commonly directed backward; mammæ 8 or less; stomach simple, and cæcum moderate. The largest are hardly of the size of a hare; they are found in Australia and Tasmania, and feed on insects and vegetable substances.—In the genus *macrotis* (Reid) the ears are very large, the tail long and covered with long hair, the tarsus long, the metatarsus hairy beneath, the innermost hind toe wanting, and the opening of the pouch directed foward. The rabbit-eared perameles (*M. lagotis*, Reid), of W. Australia, is 28 inches long, of which the tail is 10; ears about 4 inches; fur very long and soft, without admixture of spiny hairs, pale gray above, delicate vinous red on the sides, and white below. It is called native rabbit by the colonists of Swan river, where it abounds in the grassy districts, usually seen in pairs; it burrows in loose soil like the rabbit, retiring to its hole when pursued; the flesh is sweet, like that of the rabbit; its food consists of insects, especially of the larvæ of a large *buprestis* found at the roots of the acacia, equally relished by this animal and the natives. It is active in the evening, sleeping by day in a sitting posture with the head between the legs; it is of a savage disposition, even in captivity; it walks upon the hind legs widely separated, the tail assisting in the support of the body, and probably does not leap like the kangaroo.—In *perameles* (Geoffroy) the feet, tail, and ears are proportionately short; the fur has coarse hairs mixed with it; the tail is covered with very short hair; the pouch opens backward. The largest species is the thick-tailed bandicoot (*P. macroura*, Gould), 20 inches long, of which the tail is 7; fur moderately long and harsh to the touch, pencilled with black and yellow above, more yellowish on the sides, and yellowish white below; tail rat-like, with small stiff hairs, black above and brownish white below; it inhabits N. Australia. Other species are found in S. and W. Australia, many with the hair harsh, flattened, and sharp, and are generally called bandicoots.—In the genus *chœropus* (Ogilby) the fore feet have only 3 small, equal toes, with short compressed nails; hind feet with one well developed toe, the joined ones very small and high up, and the outer a mere tubercle, all with nails; muzzle long and pointed, ears very large, fore legs scarcely as thick as a goose quill, hind legs longer and about as slender; the pouch opening backward. According to Van der Hoeven, these are the only marsupials which have fewer than 5 toes on the fore feet. The pig-footed perameles (*C. castanotis*, Gray) is about 10 inches long to the root of the tail, the latter being 4 inches more; the fur is long, loose, and soft, brownish gray above, sometimes tinged with rusty, and yellowish white below; tail short-haired, black above and brownish white below; it inhabits S. Australia, making a nest, like other members of the family, of leaves and grass. Fossil remains of this family have been found in Wellington valley, Australia.

PERCEVAL, Caussin de. See Caussin.

PERCEVAL, Spencer, an English statesman, born in London, Nov. 1, 1762, assassinated in the lobby of the house of commons, May 11, 1812. He was the 2d son of John, earl of Egmont, by his 2d wife, the granddaughter of the 4th earl of Northampton, and was educated at Harrow and at Trinity college, Cambridge. In 1786 he was called to the bar of Lincoln's Inn, and in a few years was in possession of a lucrative practice. In 1796 he entered parliament for the borough of Northampton, which he continued to represent until the close of his life, and became a warm supporter of Pitt, whose favorable notice he attracted by a pamphlet on the force and extent of impeachments by the house of commons. So highly did Mr. Pitt esteem his financial abilities, that when about to fight a duel with Tierney he recommended, in case of his own fall, the appointment of Perceval as his successor. In 1801 he was appointed solicitor-general in the Addington ministry, and in 1802 attorney-general, in which capacity he conducted the prosecution in the celebrated case of Peltier, indicted for a libel on Bonaparte during the peace of Amiens. He retained his position upon the return of Mr. Pitt to office, and upon the accession of the Fox-Grenville ministry went into opposition. In 1807 he was appointed chancellor of the exchequer in the duke of Portland's cabinet, and upon the death of that nobleman in 1809 he succeeded him as first lord of the treasury. He met with his death at the hands of John Bellingham, an English merchant resident in Archangel, who, for some alleged injury by the Russian government, for which he had been unable to procure redress either from the British ambassador in St. Petersburg or from the British ministry, shot Mr. Perceval through the heart with a pistol. Bellingham had previously resolved on the destruction of the ambassador, whom he confessed he would have preferred to kill; but no opportunity occurring, he determined to shoot the first member of the administration who came in his way. He was subsequently tried for murder, and, notwithstanding an attempt to prove him insane, was convicted and hanged. Mr. Perceval's death caused a profound sensation, and upon the recommendation of the prince regent parliament settled an annuity of £2,000 upon his widow, and caused the sum of £50,000 to be vested in trustees for the benefit of his 12 children. He was a man of respectable abilities, but distinguished rather as a skilful lawyer and politician than as a great statesman. He was at one time the legal adviser of the princess of Wales, and was intimately connected with the preparation of the documents referring to the "delicate investigation," which were published in "The Book."

PERCH, Pole, or Rod (Lat. *pertica*, a long staff), a measure of length used in surveying land, equal to 5½ yards or 16½ feet. Surveyors' chains are commonly of 4 perches in length, sometimes of 2. In square measure 160 square perches make an acre, or 40 make one rood. In masonry a perch is equal to 25 cubic feet.

PERCH, a name properly restricted to the *percidæ*, a very extensive family of acanthopterous fishes, characterized by a covering of ctenoid scales, the freedom and small size of the infra-orbital bones, large mouth, many of the fin rays unjointed and inflexible spines, 7 branchiostegal rays, and the ventrals with 5 articulated rays and placed under or in advance of the pectorals. There are teeth on the vomer and generally on the palate, and the fins are always at least 7 and sometimes 8; the cheeks are not cuirassed, and there are no barbels on the lips; the stomach is cæcal, and its pyloric opening on the side; pancreatic cæca few and small, and the intestinal canal but little folded.—Leaving for works on ichthyology the consideration of the subdivisions of the perch family, only the typical genera can here be alluded to, and in the first place the genus *perca* (Cuv.), of which the common fresh water perch (*P. flavescens*) of America and the *P. fluviatilis* of Europe are familiar examples. The old genus *perca* of Artedi and Linnæus has been subdivided into 36 genera according to the number and shape of the dorsals, the characters of the teeth, the serrations of the gill covers and shoulders, size of the scales, and other characters. In the restricted genus *perca* of Cuvier there are 2 dorsals (the 2d flexible), all the teeth villiform without canines, the opercular bones serrated, the operculum spiniferous, and the tongue smooth; 14 species are described, all inhabitants of fresh water. The yellow perch (*P. flavescens*, Cuv.) is greenish yellow above, and golden yellow on the sides, with 7 transverse dark bands, widest above, and white below; centre of operculum deep green, iris golden, dorsals and caudal yellowish brown, pectorals yellow, and ventrals and anal scarlet. It attains a length of 12 to 15 inches and a weight of 2¼ lbs., though most specimens are below 10 inches; it is very generally distributed in the lakes, ponds, and streams of the northern and middle states and of the British provinces; it is easily taken by the hook or net, and is an excellent fish for the table. The *P. fluviatilis* (Linn.) is very common over Europe and most of the northern parts of Asia; the body above is greenish brown, passing into golden-yellowish white below, and on the sides are from 5 to 7 blackish bands; the dorsals and pectorals brownish and the other fins vermilion; it is a bold biter, and its flesh is excellent; it is voracious, omnivorous, and tenacious of life out of water; the female is very prolific, depositing an immense number of eggs united by a viscid substance into lengthened strings. In some allied species the single dorsal is deeply notched, and the villiform teeth are interspersed with canines.—There are some sea perches belonging to the genus *serranus* (Cuv.), with a single dorsal, canines, preoperculum rounded at the angle and smooth, 2 or more spines on operculum, and the jaws not scaly; there are 26 species, many of them handsome fishes, abundant in the warmer seas, and some of them known to the ancients under the name of *perca*. The allied genus *anthias* (Bloch), smaller, with brilliant colors and scaly jaws, was famous in ancient times, and, according to Aristotle, was called sacred by the sponge fishers, because no voracious fishes came to the places it frequented to annoy the divers. In other genera the dorsal is single and canines are absent, as in *centropristis* (Cuv.), which includes the fish often called black perch; this, with other fishes of the genera *labrax* (Cuv.), *grystes* (Cuv.), and others called white, ruddy, and sea perches, have been described under Bass. The bream (*pomotis vulgaris*, Cuv.) is often called pond perch; the white perch of the Ohio is the *corvina oscula* (Lesueur).—The salt water perch, conner, or chogset, so common around the rocky shores of New England and the British provinces, is a cyclolabroid fish of the genus *ctenolabrus* (Cuv. and Val.). In this fish (*C. cæruleus*, De Kay) the body is elongated and scaly, the preoperculum finely denticulated, lips thick and fleshy, a row of conical teeth in each jaw and a band of villiform ones behind these, the scales cycloid, and the anal fin with 3 spinous rays. It varies exceedingly in size and colors, being from 6 to 16 inches long; it is generally of a bluish color, but presents various tints of brown, rusty, coppery, reddish, or green, often with black dots, and irregular bluish lines on the head; the front teeth are larger than the others, and the upper jaw is very projectile; there is a single dorsal, with 18 strong spinous rays, with whose piercing power every school boy on the coast is familiar. It is an excellent fish for the table, and is generally fried; from June to October great quantities are taken in nets and by hook from boats, wharfs, and bridges, and always meet with a ready sale; they are kept alive in large floating cars through which the water constantly flows, whence the market is supplied; a string of these fish, of an average length of 8 inches each, cleaned and skinned, can be obtained for about a cent apiece.

PERCIVAL, James Gates, an American poet, born in Berlin, Conn., Sept. 15, 1795, died in Hazel Green, Wis., May 2, 1856. He early manifested a great fondness for literature, and at the age of 14 wrote a burlesque poem on the times. He was graduated at Yale college in 1815, and after teaching for a short time in Philadelphia began the study of medicine, with which he also joined botany. In 1820 he published a volume of poetry, which contained the first part of "Prometheus" and a few minor poems. Admitted to practice in the same year, he made two unsuccessful attempts to establish himself, the first in his native town, the second in Charleston, S. C., in which latter place he issued in 1822 the first number of the "Clio." This was a pamphlet of about 100 pages, consisting principally of verse with a few prose essays added, and was soon followed by a second part, composed entirely of verse. In 1824, through the influence of Mr. Calhoun, he was appointed assistant surgeon in the U. S. army, and was detailed to West Point as professor of chemistry in the military academy. As the duties were too laborious for him to find leisure for the pursuit of his studies, he soon resigned, and was made surgeon in connection with the recruiting service in Boston. There he contributed frequently to the "United States Literary Gazette," and edited several works, one of which was a republication of Vicesimus Knox's "Elegant Extracts." In 1827 he removed to New Haven, and the same year published the third part of "Clio," and began a revised translation of Malte-Brun's geography, which was not finished until 1843. He was also during the years 1827–'8 engaged in assisting in the preparation for the press of Webster's "Dictionary," a post for which his philological attainments admirably fitted him. His taste for natural history in general and for exploration had led him to take up the study of geology, and in 1834 he had made on his own account an examination of the ranges of trap rock in Connecticut. In the following year he was appointed, in connection with Professor Charles Shepard, to make a geological and mineralogical survey of the state. To this work Percival bent all his energies. He made a plan of the survey, and in the execution of it traversed the state so thoroughly that there was scarcely a spot in it which he had not visited; and at the time appointed for the report to be made the work was far from being finished. After considerable dissatisfaction another appropriation was ordered; and when at the expiration of the appointed period no report was forthcoming, insinuations against Percival became current. The idea of a full report was now abandoned, and after considerable difficulty, resulting partly from the enormous accumulation of materials, a condensed report of 500 utterly unreadable pages was published in 1842. About this time Percival occasionally contributed to the New Haven journals metrical versions of German, Slavic, and other lyrics, and in 1843 published "The Dream of a Day." The next 10 years, spent in retirement, were employed in his favorite studies, with debts constantly increasing, so that he was at one time forced in order to save his library from attachment to apply to his friends for aid; and about $2,000 then freely presented to him was subsequently repaid, both principal and interest. In 1853 an offer was made him by the American mining company to survey their lead mining region in Wisconsin, and in the following year he was appointed geologist of that state. The first report was published in Jan. 1855; and while he was engaged in the preparation of the second his health gave way, and after a gentle decline he died.—Percival's attainments in many branches of knowledge were of an extraordinary character. He was a diligent student of the principal modern languages of Europe, beside paying much attention to Gaelic, Welsh, the Norse and Slavic tongues; and at one time he made an elaborate report on the grammar of the Basque. He was one of the first of American scholars to welcome the researches of Bopp and Grimm, and other German philologists. With geography he was thoroughly acquainted, and was no mean proficient in botany, chemistry, and natural history. It is by his poetry, however, that he will be chiefly remembered. It has been collected and published (2 vols., New York, 1824; Boston, 1860). In his private character he was singularly modest and reserved, and troubled by a constitutional melancholy, which his experience in life tended rather to deepen than to remove.

PERCIVAL, Thomas, an English physician and moralist, born in Warrington, Lancashire, in Sept. 1740, died in Manchester, Aug. 30, 1804. He was educated at the Warrington academy, and in 1761 went to Edinburgh, where he studied medicine. Afterward he visited London, Paris, Hamburg, and Leyden, at which last place he received the degree of M.D. in 1765. In 1767 he settled at Manchester in the practice of his profession. He devoted much of his time to the investigation of subjects connected with medicine, and to his instrumentality the Manchester philosophical society owed its origin. In the latter years of his life he turned his attention to moral philosophy, and several of his works on that subject became very popular. In religion he was a dissenter. He wrote a large number of works, most of the earlier of which appeared originally in the "Philosophical Transactions" of London or Manchester, and were republished in 1767 under the title of "Essays, Medical and Experimental." Of his other works may be mentioned "Observations and Experiments on Water" (8vo., London, 1768); "Observations on the Poison of Lead" (8vo., 1774); and "Medical Ethics, or a Code of Institutes and Precepts adapted to the Professional Conduct of Physicians and Surgeons" (8vo., Manchester, 1803). Of his works on morals may be mentioned "Moral and Literary Dissertations" (8vo., Warrington, 1784), and "A Father's Instructions, consisting of Moral Tales, Fables, and Reflections, designed to promote the Love of Virtue" (8vo., London, 1788). After his death his collected works, with a memoir and selections from his correspondence, were published by his son (4 vols. 8vo., London, 1807).

PERCUSSION, in medicine. See Auscultation.

PERCUSSION CAP. See Fulminates.

PERCY, Thomas, D.D., an English prelate and scholar, born in Bridgenorth, Shropshire, April 13, 1728, died in Dromore, Ireland, Sept. 30, 1811. He was the son of a grocer, was educated at Christchurch college, Oxford, and having taken orders received in 1756 the rectory of Wilby and vicarage of Easton-Mauduit, Northamptonshire. His first literary production was the translation from the Portuguese of a Chinese novel entitled *Hau Kiou Choan* (1761), which was soon followed by "Miscellaneous Pieces relating to the Chinese;" a translation from the Icelandic into Latin and English of 5 pieces of runic poetry (1763); a new version of "Solomon's Song," with notes and a commentary (1764); and a "Key to the New Testament" (1765). He was now intimate with most of the literary men of his time, and in 1764 Dr. Johnson passed 3 months at his vicarage, where he found him eagerly engaged in preparing the collection of old songs and ballads to which he owes all his present celebrity. The "Reliques of Ancient English Poetry" appeared in 1765. The greater part of the collection was taken from an old manuscript in the editor's possession, and many other pieces were obtained from the Pepysian library. The reception of the book was not at first enthusiastic, but it procured for Percy the appointment of domestic chaplain to the duke and duchess of Northumberland in 1766, and chaplain in ordinary to the king in 1769. In 1778 he was made dean of Carlisle, and in 1782 bishop of Dromore in the county Down, where he passed the rest of his life engaged chiefly in the duties of his diocese. In his latter days he became totally blind. Dr. Percy was himself a poet of considerable merit. His "Nancy, wilt thou come with me?" and "The Hermit of Warkworth," a poem connected with the history of the noble family of Percy to which he was reputed to belong, are well known; and the beautiful ballad of "The Friar of Orders Gray," which appears in the "Reliques," is mostly his own composition. He also published in 1770 the "Northumberland Household Book," and a translation of Mallet's "Northern Antiquities."

PERCZEL, Móricz, a Hungarian general, born in the county of Tolna in 1814. He studied at Pesth, served for some time in a corps of military engineers, subsequently represented his native county at the diets of 1839–'40, 1843–'4, and 1847–'8, and after the revolution of March, 1848, was elected by the city of Buda a member of the new national assembly. Belonging to the extreme liberal or radical party, he became a favorite with the youth of the capital. On the approach of Ban Jellachich in September he formed a body of volunteers, and assisted by the militia of various south-eastern counties, as well as by Görgey, he compelled an isolated Croatian corps to surrender at Ozora (Oct. 7). This achievement raised him to the rank of general, and he subsequently acted with success on the Mur and Drave, and crossing the frontier made a short incursion into Styria. The advance of Windischgrätz in December caused the recall of his corps; but before he could join the retreating army of Görgey, he was suddenly attacked at Moor by Jellachich and his force entirely scattered (Dec.

29). He soon collected the remains of his corps, and undertook, in Jan. 1849, the defence of the left bank of the middle Theiss; but after well executed attacks on the Austrians at Szolnok and Czegléd, he was superseded by the Polish general Dembinski. In March he was sent to the south, relieved Peterwardein, stormed the ramparts of Szent-Tamás, the principal stronghold of the enemy, entered the Banat, and advanced as far as Pancsova (May 10). After numerous quarrels with other generals and the members of Kossuth's new administration, he was deprived of his command at the end of June. He collected a new body of volunteers, joined Wysocki at Czegléd in July, retreated with him toward Szegedin, and, again deposed, fought with Dembinski in the fatal battle of Temesvár (Aug. 9), after which he withdrew to Turkey, where he was for some time acknowledged as the head of a radical fraction of the Hungarian refugees. He repaired to England in 1851, and settled in the island of Jersey, where he still resides.

PERDICCAS, a general of Alexander the Great, and regent of the Macedonian empire, assassinated near Memphis in 321 B. C. He was descended probably from the royal house of Orestis, a Macedonian province, and early attached himself to the court of Philip, and at the time of the assassination of that monarch was one of the officers of his body guard. In the earlier campaigns of Alexander he commanded one of the divisions of the phalanx at the battles of the Granicus, Issus, and Arbela, was subsequently transferred to the command of a division of the horse guards, and was frequently employed in separate commands, not only in connection with others, but as sole general. When Alexander made a distribution of honors at Susa, Perdiccas received for his services a crown of gold, and a daughter of the satrap of Media in marriage. After the death of the king, he bore a prominent part in the troubles which followed between the cavalry and the infantry, and after the settlement of the quarrel he was made regent under the title of chiliarch of the horse guards. In this position he succeeded in crushing Meleager, his co-regent, with all of his principal partisans. Although feared and hated by the other leading generals, he managed for a time to retain his power in security. A revolt of the Greek soldiers in the upper provinces of Asia was put down by Pithon, one of his officers. In 322 B. C. he invaded Cappadocia, defeated its satrap Ariarathes in two battles, and having reduced the country intrusted its government to Eumenes. Afterward he marched into Pisidia, and captured Laranda and Isaura. He proposed to marry Nicæa, daughter of Antipater, and put to death Cynane, the half sister of Alexander; but this aroused so much indignation among the soldiers, that he was forced to marry her daughter to the king Arrhidæus. An attempt to bring Antigonus to account for his conduct in the management of his government led to hostilities. Antigonus fled to Macedonia, and Antipater, Craterus, and Ptolemy formed a league and declared war against Perdiccas. He determined to attack Ptolemy, and, leaving Eumenes behind in command in Asia Minor, set out for Egypt, and marched as far as the Nile without opposition. In attempting to cross that river he was repeatedly repulsed, and in the last effort lost so many men that the discontent in his army, which for a long time had existed in secret, broke out in open mutiny. A number of officers, headed by Seleucus and Antigenes, went to his tent and there despatched him. Perdiccas was reputed a man of great military talents and personal courage; but his disposition was crafty and cruel, his ambition grasping and unscrupulous.

PERDIDO, a small river and bay, which form the W. boundary of Florida, separating Escambia co. in that state, from Baldwin co., Ala. Perdido bay is more properly a lake, into which the river expands near its mouth. It is landlocked, and its outlet into the gulf of Mexico is so small, and enters at so acute an angle with the line of coast, as to be almost undistinguishable from sea, from which circumstance the river probably derived its Spanish name *Perdido*, or "lost." There are generally but 4 or 5 feet of water on the bar at its mouth. The Perdido was noted from a very early period as the boundary between the French and Spanish colonies of Louisiana and Florida.

PÈRE DUCHESNE. See Hébert.

PEREGRINE FALCON. See Falcon.

PEREIRA, Jacobo Rodriguez, a Spanish instructor of deaf mutes, of Jewish family, born in Berlanga, Estremadura, in 1715, died in Paris in 1780. He opened a school for deaf mutes at Cadiz, but was not able to maintain it, and about 1742 removed with his family to Bordeaux. In 1745 he taught a mute in Rochelle to pronounce some words. This coming to the knowledge of D'Azy d'Étavigny, the comptroller of that city, he begged him to undertake the education of his deaf-mute son. Pereira consented, and the next year addressed the academy of sciences in Caen on the results of his instruction. After some years he appeared before the academy of sciences in Paris with young D'Étavigny, whose proficiency excited their admiration. A few months later he appeared with his pupil before Louis XV. The king examined the youth very thoroughly, and was so much pleased with his proficiency, that he bestowed on Pereira a pension of 800 francs. In 1754 he presented one of his pupils before King Stanislas of Poland. Several of his pupils were distinguished in the subsequent history of France. One of them, Saboureux de Fontenai, wrote an account of his teacher's manner, and the thoroughness of his instruction. (See Deaf and Dumb.)

PEREIRA, Jonathan, an English physician and pharmacologist, born in London, May 22, 1804, died there, Jan. 20, 1853. At the age of 14 he was apprenticed to a surgeon and apothecary, in 1821 attended the Aldersgate street dispensary, in 1822 became a pupil of St. Bartholomew's hospital, and in March, 1823, received a license to practise from the society of apothecaries. On his appointment not long after as apothecary of the Aldersgate street dispensary, he became a private tutor, and published a number of works, chiefly for the use of students about to be examined. He translated the Latin pharmacopœia of the London college of physicians, and published a number of Latin prescriptions under the title of *Selecta e Præscriptis*. Turning his attention to chemistry, he compiled "A General Table of Atomic Numbers," and in 1826 was appointed lecturer in chemistry in the Aldersgate street school of medicine. The lectures which he subsequently delivered on materia medica were originally published in the "Medical Gazette," and in 1839 were revised and republished under the title of "Elements of Materia Medica and Therapeutics." To this work he owed his reputation. In 1840 he received the degree of M.D. from the university of Erlangen, became the same year assistant physician to the London hospital, was subsequently admitted as a London licentiate of the college of physicians, and in 1845 was elected fellow of the college. In 1842 he published a work on "Food and Diet." In 1851 he was made full physician of the London hospital. Beside the works already mentioned, which were chiefly compilations, he published several original treatises in various medical and pharmaceutical journals, and wrote a series of "Lectures on Polarized Light." At the time of his death he was examiner at the London university.

PEREIRA DE SOUZA. See Caldas Pereira de Souza.

PEREIRE, Émile and Isaac, French financiers of Jewish origin, born in Bordeaux, the former in 1800, the latter in 1806. They are brothers, and grandsons of Jacobo Rodriguez Pereira. Having removed to Paris and entered into business, they became ardent votaries of Saint-Simonism. They wrote for various journals, including the *Producteur*, the *Globe*, the *National*, the *Temps*, the *Journal des connaissances utiles*, and the *Journal des débats*, in the last of which Isaac originated a daily report of the bourse. Under the guaranty of the Rothschilds they obtained the contract for building the St. Germain railroad, of which Émile was the originator; and afterward under the same auspices they constructed the more important northern railroad. They built the *chemin du midi* and the *canal latéral* on their own responsibility. The *crédit mobilier* was founded in 1852, chiefly through their agency, and they have since been prominently concerned in its management. (See Crédit Mobilier.)

PEREZ, Antonio, a Spanish statesman and author, born at Monreal de Ariza, Aragon, in 1541, died in Paris, Nov. 3, 1611. He was a natural son of Gonzalo Perez, minister for 40 years to Charles V. and Philip II., was legitimated in his infancy, and educated at Louvain, Venice, and Madrid. On his father's death he became one of the two chief secretaries of state. Adroit, industrious, and a skilful and unscrupulous politician, he soon became the depositary of Philip's most intimate confidences. When the king wished to put out of the way Juan de Escovedo, the secretary and adviser of John of Austria, whom he suspected of designs upon the crown, Perez was employed to have him assassinated (1578). Escovedo was stabbed in the street by hired bravos, but it is now believed that Perez had a personal motive in causing his death, because Escovedo was acquainted with the minister's intrigue with the princess of Eboli, the king's mistress. However this may be, Perez and the princess were arrested 2 months afterward, ostensibly to satisfy the demands of Escovedo's relatives, and the former was condemned to 2 years' imprisonment, 8 years' exile from court, and a heavy fine. At first Philip appeared anxious to make his punishment as light as possible, and assigned his own house as the place of confinement; but after he had obtained all the papers which might prove his own share in the murder, he sent the ex-minister to the fortress of Turreguano, and extorted from him on the rack a confession that he had killed Escovedo, coupled however with the declaration that he did it by the royal command. Perez would probably have lost his head but for the devotion of his wife, who in July, 1590, procured him the means of escape to Saragossa, where he placed himself under the protection of the *fueros* or independent jurisdiction of Aragon. The king, in violation of these constitutional privileges, ordered him to be seized, but the people forcibly released him. Philip then caused him to be transferred to the prison of the inquisition on a charge of heresy. The populace again restored him to liberty, and the consequence was an armed revolt which gave Philip a long desired opportunity to extinguish the *fueros* for ever. In the mean time he escaped to France, and was sent by Henry IV. on a secret mission to England, during which he published a narrative of the occurrences in which he had been concerned; but such was his dread of Philip, who indeed attempted several times to have him assassinated, that he expressed himself in a guarded and enigmatical way, which has contributed to render the whole affair one of the most mysterious romances of history. Recalled to France in 1595, he received a house for his residence and a guard to protect him, and in the same year was again sent to England. After the accession of Philip III. his wife and children, who had been kept in prison, were liberated (1599), but all his efforts to be recalled to Spain were in vain. He undertook a third mission to England in behalf of his native country in 1604, but miserably failed, and returning to France passed his last days in penury. Beside his *Relaciones* already mentioned, he wrote *Cartas familiares*, several political works, and a life of Philip II. which has never been printed. A collection of his works appeared at Geneva in 1654. His style, particularly in his letters, is often faulty and overstrained, but abounds in passages of eloquence and pathos, and in pointed sayings, many of which have become proverbial. He wrote in remarkably idiomatic Castilian. Much light has been thrown upon his career by M. Mignet in his *Antonio Perez et Philippe II.* (Paris, 1845; translated into English in 1846).

PERFUME, a term applied to the scent arising from odoriferous bodies, and also to these bodies themselves when they are prepared especially for the sake of their agreeable odor. The art of preparing them is called perfumery, and by the French is made to include the compounding of a great variety of articles for toilet use, as pomades, hair powders, oils, depilatories, cosmetics, dentifrices, soaps, &c., all of which are scented by the introduction of various perfumes. From the most ancient times perfumes of various sorts have been held in high estimation. They exert a pleasant influence upon most persons, though to a few they are offensive. Solomon (Prov. xxvii.) remarks that "ointment and perfume rejoice the heart." They were prescribed as medicines by Hippocrates, Criton, and other ancient physicians. It is affirmed that after the destruction of the clove trees by the Dutch in the island of Ternate, the colony suffered from epidemics unknown before; and in times when the cholera has prevailed in London and Paris, those employed in the perfumery factories have escaped its ravages. The Egyptians prepared them for different purposes, as for embalming the dead, as offerings to the gods, and for domestic uses. They anointed their bodies with oil, and it was the custom to pour sweet-scented oils upon the heads of newly arrived guests. In their tombs are found boxes of alabaster, onyx, glass, ivory, &c., in which the ointments were kept. One of these now in Alnwick castle contains an ointment of which the scent is still retained. The perfumes employed in embalming are also preserved in the mummies. (See EMBALMING.) The Egyptians obtained the materials of their perfumes, such as bitter almonds and origanum, from their own soil, and also imported perfumes from Arabia and India. In the Old Testament frequent reference is made to the use of perfumes by the Hebrews. The sweet incense burned upon the altar was a perfume; and "the art of the apothecary," or as some read it "perfumer," is distinctly named in Exod. xxx., where Moses is directed to prepare the oil of holy ointment from the principal spices, myrrh, sweet cinnamon, sweet calamus, cassia, and olive oil; and also to prepare a perfume of other spices named near the close of the same chapter. See also Psalm xlv. 8, Prov. vii. 17, Cant. i. and iv., Jer. vi. 20, and various other places; and in the New Testament (Mark xiv.), the story of the woman with the alabaster box of precious ointment. Other nations of antiquity, as the Phœnicians, Assyrians, and Persians, are known to have made great use of perfumes; and Tyre was a famous mart whence they were exported by sea, as Babylon was for the supply of the interior (Ezek. xxvii.).—The art of perfumery was practised to an extraordinary extent by the ancient Greeks and Romans. The odor of perfumes was an offering to the gods, and the apparition of these was always represented as accompanied by an ambrosial fragrance. Oils, pomatums, and other perfumes were made in great profusion and most lavishly used. After bathing and in their athletic exercises the Greeks applied them liberally to their persons; and, as Seneca states, it was their custom to anoint themselves twice or even thrice a day in order that the delicious fragrance might never cease. To such an extent was this carried, that Solon enacted a law forbidding the Athenians to use them. Their wines were perfumed by infusing in them roses, violets, and hyacinths—the first step, perhaps, in the preparation of alcoholic perfumes. Capua was especially celebrated for its perfumes. One of its principal streets, called the Seplasia, it is stated, was made up entirely of shops devoted to this trade; and it was also largely carried on in several other towns of Greece and southern Italy. Pliny in his "Natural History" has given a very full account of the extraordinary varieties of perfumes in use by the Romans under the emperors. The perfumers (*unguentarii*) were mostly Greeks, and occupied a special quarter of the city. Their shops were supplied with aromatics from all parts of the known world, and were a favorite resort for fashionable loungers. Their productions were quite as numerous as the perfumes of the present day, and much more profusely used. The same taste continued under the Greek emperors; and in the oriental church the consumption of aromatics was so great, that at one time a tract of land of 10 square miles in Syria was especially devoted to the production of incense trees. The Arabs introduced their use into Spain with many curious receipts, some of which are still preserved and are supposed to have been handed down from the Egyptians. In the middle ages France and Italy were most conspicuous for the manufacture and use of perfumes. Incense and fragrant tapers were consumed in the Catholic churches even as far back as the baptism of Clovis, the first Christian king of France, in 496. Charlemagne made use of perfumes, and Philip Augustus in 1190 granted a charter to the master perfumers. Alcoholic perfumes are supposed to have been first made in the 14th century; and the first of these of which we have an account is Hungary water, distilled from rosemary in 1370 by Elizabeth, queen of Hungary, who received the receipt from a hermit, and by the use of it is said to have preserved her beauty to old age. Catharine de' Medici, when she came to France to marry Henry II., brought with her a famous Florentine perfumer named René, and from that time the French made great progress in the art; but from the receipts that have been preserved it appears that their processes were very rude and unscientific. In England a taste for perfumes appears to have been prevalent in the time of Shakespeare; and in that of Dean Swift the shops of the perfumers were the resorts of loungers, as they were in ancient Rome:

> First issued from perfumers' shops
> A crowd of fashionable fops.

But their use must afterward have declined, for in Chambers's "Cyclopædia," published in 1740, it is stated that perfumes were disused there, but were *à la mode* in Italy and Spain. At the present time the manufacture of perfumes is chiefly carried on in Paris and London, and in various towns near the Mediterranean, especially in the south of France. The fruits and flowers of those sunny regions afford the greatest variety of fragrant odors, and certain districts are famous for their peculiar productions; as Cannes for its perfumes of the rose, tuberose, cassia, jasmine, and the neroli, extracted from the leaves of the bitter orange; Nîmes for thyme, rosemary, aspic, and lavender; Nice for the violet and reseda; and Sicily for the lemon, bergamot, and orange. In England some of the essential oils are prepared from native herbs upon a large scale, as at Mitcham in Surrey, where a ton of peppermint and of lavender is sometimes distilled at once. In the northern United States many of the essences and essential oils are also largely prepared, the woods furnishing the wintergreen, sassafras, and other sweet-scented plants, and the gardens the peppermint, rose, &c. In London, it is stated, there are about 40 manufacturing perfumers, employing each from 20 to 100 hands; and the total annual value of their productions is believed to be fully £1,000,000. A large portion of this consists of fancy soaps, which are exported in great quanties to the United States. In Paris there are about 80 perfumers, employing from 2,000 to 3,000 hands; and the export trade averages annually from 12,000,000 to 13,000,000 francs, having doubled in the last 25 years. The home consumption probably equals in value the foreign exports. —Perfumes are derived from a great variety of flowers, fruits, seeds, woods, and other vegetable products; and by the skilful combining of different scents, some are obtained that imitate the odor of flowers which are not themselves used in perfumery. But it is not from plants alone that perfumes are obtained. At the close of the article ESSENTIAL OILS allusion is made to the strange sources which by the aid of recent chemical discoveries have been made to furnish some of the choicest perfumes. The delicate scent of flowers has been traced to certain oils and ethers, which can be elaborated from substances associated only with the most disgusting odors. The fetid fusel oil by different methods of treatment produces oils not to be distinguished from those of various fruits; the noisome oils of gas tar are made to yield the nitro-benzole known as the oil of bitter almonds or essence of mirbane, which is now extensively used for perfuming soap, and is even preferable for confectionery and culinary uses to the genuine article (unless this is distilled over potash), as it contains no prussic acid; and from the drainage of cow houses is extracted an essential ingredient in the famous *eau de mille fleurs*. A new and unlimited field is thus opened for the artificial production of perfumes; and it is believed that by the employment of a few common essential oils and the organic radicals, all the odors in the vegetable, animal, and mineral kingdom may be successfully reproduced. The perfumes derived from animal sources are musk, civet, ambergris, hartshorn, &c. The ambergris, though having little scent itself, imparts a most ethereal and delicate odor to other perfumes. In an elaborate paper upon perfumery furnished by Mr. Eugene Rimmel to the society of arts of London, and published in No. 391 of their "Journal" (May 18, 1860), scents in general use are classified in 18 groups, and the vegetable products used in this art are arranged in 10 divisions, as follows: 1, the floral series, viz., jasmine, rose, orange flower, cassia, tuberose, violet, jonquil, and narcissus; the attar or otto of roses (see ATTAR OF ROSES) is the most valuable product of this division; 2, the herbal series; 3, the *andropogon* series, a genus of plants of this name in Ceylon, which furnish the lemon grass, citronella, and ginger grass oil; 4, the citrine series, comprising the bergamot, orange, lemon, cedrat, and limette, from whose rinds an essential oil is obtained by expression or distillation; 5, the spice series, including cassia, cinnamon, cinnamon leaf, cloves, mace, nutmeg, and pimento; 6, the wood series, consisting of sandal wood, rose wood, rhodium, cedar, and sassafras; 7, the root series, comprising orris root and vetivert, of which the latter, called by the Hindoos *kus-kus*, the root of the *anatherum muricatum*, is made in India into mats and blinds, which being often watered and exposed to the sun shed a most agreeable and lasting perfume; 8, the seed series, composed of aniseed, dill, and caraway; 9, the balm and gum series, including the balsams, camphor, myrrh, and other gums; 10, the fruit series, including bitter almonds, Tonquin beans, and vanilla. The artificial preparations, above referred to, and the animal perfumes make two more series. The greatest number of the materials, amounting to 28, is obtained from the south of France and Italy, which is the chief centre of manufacture for perfumery materials. The East Indies and China furnish about 21, Turkey 2, Africa 2, North America 6, South America 6, and England 4. The only articles named from the United States are peppermint, sassafras, and wintergreen.—The manufacture of perfumes in the south of France is extensively carried on in the towns of Grasse, Cannes, and Nice. In Grasse about 70 establishments are engaged in this business and in distilling essential oil, and in the other two towns about 80 houses more. The quantities of materials annually consumed and their values are thus approximately estimated:

Orange flowers	1,700,000	lbs.,	worth	about	$161,000
Rose flowers	430,000	"	"	"	80,000
Jasmine flowers	110,000	"	"	"	60,000
Violets	62,000	"	"	"	35,000
Cassia	66,000	"	"	"	50,000
Tuberoses	52,000	"	"	"	13,000

The manufactured articles consist of

Scented pomades and oils, about	600,000	lbs.,	worth	about	$1,250,000
Rose water, about	178,000	"	"	"	25,000
Orange flower water, 1st quality, about	1,110,000	"	"	"	120,000
Orange flower water, 2d quality	2,250,000	"	"	"	225,000

These do not include the essential oils, some of which are very valuable, the neroli, for instance, being worth about $50 per lb. The supply of these articles is insufficient for the demand, and as the crop of some one of the flowers occasionally fails, the manufacturers are put to serious inconvenience. It is hence recommended to foster the extension of the trade into other countries, where the flowers might be successfully cultivated; as in Spain, Portugal, and various tropical countries in both hemispheres.—Several methods are in use for extracting the odoriferous properties of plants, and imparting these to spirits or greasy bodies. Some of the processes are noticed in the articles EAU DE COLOGNE, ESSENTIAL OILS, and EXTRACTS. In the preparation of pomades the best fat employed is the marrow of the ox; but a cheaper fat is often substituted for it, or a mixture of beef or veal fat and lard. These are beaten in a mortar, melted in a water bath, and then strained. Before the mixture cools the essential oil selected for the perfume is added and stirred in; or the flowers themselves are thrown in and left to digest for several hours, when they are taken out, the fat is again heated and strained under pressure, and fresh ones are put into it; and this is continued for several days till the grease has sufficiently imbibed the odor. It is then strained in cloth bags. This process is called maceration. Inodorous oils, such as the oil of behn, described by Piesse in his work on perfumery, are well adapted for taking up the perfumes of flowers by this process. Pure olive oil is largely used for this purpose in the south of Europe. But for delicate plants, such as the jasmine, tuberose, and cassia, the odoriferous principle of which would be injured by the heat, the process in use is that of absorption or *enfleurage*. Square wooden boxes are provided having bottoms of glass plate. Upon these is spread a layer of purified lard and suet mixture, and upon this freshly gathered flowers are spread every morning, as long as the flower is in bloom. The boxes are kept shut, and the grease finally acquires a very strong odor. To aromatize oil in the same way, the boxes have a wire bottom upon which cotton cloths soaked in the oil are laid, and the boxes or frames are piled upon each other to keep them close. When a number of cloths are charged with the perfume, they are subjected to the action of a press for recovering the oil. Spirits are scented by maceration or by digesting them with essential oils in a water bath and agitating them at times for several days. The *eau de mille fleurs* is prepared on this plan in Paris with the following ingredients and proportions: alcohol, 6 litres; orange flower water, 4 litres; balsam of Peru, 60 grammes; essence of bergamot, 120 grammes; essence of cloves, 60 grammes; essence of neroli, 15 grammes; essence of thyme, 15 grammes; essence of musk, 190 grammes. The last named essence is prepared by digesting in the heat of the sun for 2 months 15 grammes of civet and 75 grammes of musk in 2 litres of alcohol perfumed with ambergris. Scented vinegar is prepared in a similar way, vinegar being substituted for alcohol. Another method of preparing perfumes has recently been discovered and introduced by M. Millon, a French chemist. He found that the aromatic principle of vegetable matters might be extracted together with some fatty or waxy matters by treating them with purified ether or sulphuret of carbon; and that by evaporating the volatile solvent at a temperature below that of the surrounding atmosphere, the perfume is retained and fixed in the residuum without undergoing any change. The substance deposited by the treatment of different plants is variously colored; it is sometimes solid, or oily or semi-fluid, becoming solid after some time. The solvent may be collected as it condenses in the distillation, and the same may be used several times over; but it should always be for the same flower, and with the same apparatus. The choicest parts of the plants or flowers are carefully selected in this process, and used exclusively, by which mode much more delicate results are attained than by the ordinary mode of distillation. A remarkable peculiarity of the perfumes thus prepared is that they may be kept open to the air without being dissipated and lost. They may be separated from the waxy matter by alcohol, which dissolves them together with a little of the oily and coloring matters; and in this state they may be conveniently mixed with fats and oils.—Pastilles are articles of perfumery made when set on fire to consume slowly and give out the odor with which they are charged. They are composed of charcoal finely pulverized, saltpetre, and the odoriferous substances, chiefly gum resins, the whole moulded into little cones, which are made to adhere together by the addition of mucilage. The *pastilles du serail* consist of 24 grammes of olibanum, 24 of storax, 16 of nitre, and 124 of pulverized charcoal. For rose pastilles there are added to the above 32 grammes of rose leaves and 2 of essence of rose; for orange flower pastilles 24 grammes of galbanum, 32 of dried pulverized orange peel, and 2 of essence of neroli; for vanilla, 24 grammes of galbanum, 16 of cloves, 32 of vanilla, 1 of essence of cloves, and 16 of essence of vanilla. Odoriferous spirits for burning are prepared in a similar way, the vanilla being generally replaced by gum benzoin.—The powdered almond paste used in perfumery is prepared from the residue of the bruised kernels of apricots or almonds, sweet or bitter, after the oil is pressed out. This is ground and sifted. The paste is variously prepared from the powder. One process is to mix together 250 grammes each of the powder and of honey, with 500 grammes of the oil of bitter almonds and the yolks of 4 eggs. Perfumed soaps are prepared by substituting pomade for the grease in mixture with soda lees.

PERGAMUS, or PERGAMUM. I. The name of the citadel of Troy, frequently used by poets for that city itself. II. An ancient city of Asia Minor, in the Mysian district of Teuthrania, and capital of a kingdom of the same name. It was built in the delightful valley of the Caïcus, at the foot of two hills near the N. bank of that river, and at its confluence with the Cetius and Selinus, the latter of which flowed through the city. The acropolis was built on one of the hills. Pergamus was founded by a colony of Arcadians, or, according to other traditions, by Epidaurians under Æsculapius, who was worshipped as the patron of the place. Its name is derived by some from that of Pergamus, the son of Pyrrhus and Andromache, who is said to have slain a Teuthranian king in single combat and taken possession of his territory. Having belonged successively to the Persians, the empire of Alexander the Great, and the Thracian kingdom of Lysimachus, it was betrayed by Philetærus, the commander of the strong citadel, where Lysimachus had deposited his treasures, into the hands of Seleucus I. of Syria. When Seleucus died, Philetærus made himself independent (280 B. C.). His nephew and successor Eumenes I. (263–241) extended his dominion over parts of the neighboring provinces, having vanquished Antiochus Soter in a battle near Sardis. Attalus I. (241–197), a cousin of Eumenes, routed the invading Gauls, assumed the royal title, and assisted the Romans in their wars against the Achæans and Philip of Macedon. His son Eumenes II. (197–159) supported the Romans against Antiochus the Great, and after their victory at Magnesia (190) was rewarded by the annexation to his dominions of the whole of Mysia, Lydia, Phrygia, and other neighboring provinces. Pergamus now became one of the most splendid cities of Asia, rivalling by its library, a renowned school of literature, and the invention of parchment, the principal glories of the capital of the Ptolemies. Attalus II. (159–138), the brother of Eumenes II., maintained his alliance with Rome, and like his predecessors was a promoter of science and literature. His nephew, Attalus III. (138–133), ruled like a madman, destroying his own relatives, and finally bequeathed his whole kingdom to the Romans, who after a contest with Aristonicus, a natural son of Eumenes II., erected it into the province of Asia, of which Pergamus became the splendid capital. It afterward decayed, however, being deprived of its treasures of literature by Antony, who attached them to the library of Alexandria, and subsequently also of its dignity as capital of the province under the Byzantine rule. It was one of the principal Asian seats of Christianity in its earliest period. It was finally destroyed during the Turkish wars, but its extensive ruins, including remains of temples, a theatre, and an amphitheatre, are still visible.

PERGOLESI, GIOVANNI BATTISTA, an Italian composer, born at Jesi, in Ancona, in 1710, died at Torre del Greco, near Naples, in 1737. He was educated at the Neapolitan conservatory *dei poveri in Gesu Cristo;* but discovering that in this institution taste and melody were sacrificed to pedantry, he left it at the age of 14, and received lessons in vocal composition from Vinci and Hasse. At 20 years of age he procured an engagement at the *teatro nuovo*, Naples, for which he wrote comic intermezzos, including the *Serva padrona*, subsequently produced with great enthusiasm at Paris. In 1735 he brought out at Rome his opera of *Olympiade*, which was coldly received, notwithstanding it was highly commended by contemporary musicians. His sacred compositions were better appreciated, and few works of their class have been more admired than his mass in D, containing the celebrated *Gloria in Excelsis*, and his *Dixit Dominus* and *Laudate.* Two years before his death his health began to fail rapidly, and by the advice of his friends he removed to Torre del Greco, near the foot of Mt. Vesuvius. Here during his last illness he composed his cantata of *Orfeo ed Euridice*, his *Salve Regina*, and his celebrated *Stabat Mater.*

PERIANDER, tyrant of Corinth, succeeded his father Cypselus probably about 625 B. C., died about 585 B. C. At first his reign was mild, but afterward became exceedingly inhuman and oppressive. Herodotus says that Periander sent a herald to Thrasybulus, tyrant of Miletus, to ask him what mode of government it was safest to adopt in order to rule with security. Thrasybulus, making no direct reply, took the messenger into a corn field, and walking through it broke off and threw away all the ears that overtopped the rest. Periander understood the meaning of the action, and thenceforth constantly depressed the power of the higher orders by putting to death or banishing prominent citizens. Although the particular incidents of his reign are all or nearly all of doubtful authenticity, it seems to be a fact that his administration, supported by a powerful body guard, was exceedingly rigorous, that he suppressed common tables, clubs, and public education, shed much blood, and made exorbitant exactions. On one occasion it is said that the women of Corinth, whom he had invited to a religious festival, were stripped by his order of their rich attire and ornaments. Later writers depict him as the foe of luxury and dissolute habits, preventing the great accumulation of wealth by individuals, punishing also those who squandered their property, and once ordering the procuresses of Corinth to be thrown into the sea. By Aristotle he is spoken of as the first who brought to a system the art of ruling despotically. His foreign policy was vigorous and successful. According to Herodotus, deceived by a scandalous report, he had put to death his wife Melissa, the daughter of Procles, tyrant of Epidaurus, though he was warmly attached to her; and when in after years his two sons visited the court of the latter, their grandfather told them the manner of their mother's death. The younger son, Lycophron, on his return refused to have any intercourse with his father; whereupon Periander sent him away to Corcyra, invaded Epidaurus, reduced it, and took Procles prisoner. Afterward he endeavored to persuade Lycophron to return and take charge of the kingdom; and finally the latter consented on condition that his father should abdicate and live in Corcyra. But the inhabitants of that city, wishing to keep Periander away, put his son to death. Periander is said to have died of grief, after having lived about 80 years. He was an encourager of poetry and music, and was usually reckoned among the seven sages of Greece, although some placed in his stead Myson of Chenae in Laconia. Arion and Anacharsis were patronized by him, and by Diogenes Laërtius he is said to have written a didactic poem of 2,000 verses. He was succeeded by a relative, Psammetichus, son of Gordias.

PERICARDITIS. See HEART, vol. ix. p. 12.

PERICLES, an Athenian statesman, born at Athens about 495 B. C., died there of the plague in 429. He was of an ancient and noble family; his father was Xanthippus, who, with the Spartan general Leotychides, defeated the Persians at Mycale; his mother was Agariste, niece of Clisthenes, who expelled the Pisistratidae from Athens. On the father's side he was connected with the family of Pisistratus, and on the mother's side he was descended from the princes of Sicyon and the Alcmæonidæ. When the Messenians rose against Sparta in 464 B. C., and fortified themselves on Mt. Ithome, the Spartans invoked the aid of the Athenians to reduce the place. Cimon, the leader of the aristocracy at Athens, and the greatest commander of his time, was sent with a large force in answer to the appeal. But he failed to reduce the fortress, was slighted by the Spartans, and returned home in disgrace. The popular party was then led by Pericles, between whom and Cimon there existed a hereditary feud; for it was Xanthippus, the father of Pericles, who had impeached Miltiades, the father of Cimon. Taking advantage of the unpopularity which the ill fortune at Mt. Ithome brought upon Cimon and the aristocracy, Pericles caused a measure to be carried in the popular assembly, by which the court of the areopagus was nearly shorn of its political power. This was a fatal blow to the aristocracy, and constituted, with other changes, a political revolution. Among these changes were the institution of dicasteries or jury courts, in which jurors were paid for their attendance, and the almost complete abrogation of the judicial power of the senate of 500. The tablets containing the laws of Solon were transferred from the acropolis to the neighborhood of the market place, as if to signify that the guardianship of the laws had passed into the hands of the people. The ascendency of Pericles and the popular party thus established cost many a violent struggle. The poet Æschylus enlisted all his powers, in the drama of the "Eumenides," against these innovations; but his opposition resulted only in his own flight from the city, while Cimon himself, who, in the struggle between the aristocratic and democratic parties, had before narrowly escaped banishment, was soon after driven into exile by ostracism (about 459). On the other hand, Ephialtes, a leader, with Pericles, of the popular party, a man of rigid integrity, who had been most conspicuous in the passage of the obnoxious measure against the areopagus, was, about the time of Cimon's recall from banishment (453), assassinated by a Bœotian emissary of the aristocracy. The humbled aristocracy afterward united themselves under the party lead of Thucydides, the son of Melesias. In the popular assembly they were drilled into a compact party organization, occupying seats together instead of being mixed up with the general mass of citizens. Thus their applause or dissent could be made more effective, and in debate they could concert their measures and use their strength to the best advantage. But this concerted action soon brought suspicion upon them, which passed, on account of the fewness of their number, into contempt. They complained of the administration of Pericles, that the fund derived from the confederacy of Delos, intended for purposes of general defence against the Persians, had been misapplied in the adornment and strengthening of Athens. Pericles claimed the right to use in this way so much of the public treasure as was not needed for the common defence. He was sustained, and Thucydides driven into banishment. This annihilated the aristocratic party, and left to Pericles the undisputed conduct of affairs. He had succeeded to the political principles of Themistocles, and he labored first to make Athens the capital of Greece, the centre of political power and influence, and the seat of art and refinement; and secondly to elevate the public spirit of his countrymen. He gave respectability and value to the elective franchise by setting close guards against a fraudulent abuse of it, and thus made even the humblest citizen feel something of the dignity of Athenian citizenship. He trained the people in naval affairs by sending out every year a squadron of 60 triremes to cruise for 8 months in the Ægæan. He planned great architectural works to embellish and strengthen the city. He built the Odeon for theatrical exhibitions, and the Parthenon with its splendid approach called the propylæa. To render secure the communication of Athens with the sea, chiefly through his advice, the long walls had been built which stretched to the Piræus and Phalerum; and to increase this security he afterward added a third wall, and improved and beautified the Piræus. He further provided for the poorer classes and strengthened the state by an enlightened system of colonization. For the entertainment of the people he added to the pomp and magnificence of popular spectacles, established new ones, and made the theatres and public festivals accessible to the poorer classes. He democratized the legislative and judicial functions of government by paying jurors and legislators. Nor even were the higher classes sacrificed that the democratic element might be fostered. Literature, architecture, painting, and sculpture rose under him to the highest perfection. In his foreign policy he aimed at the aggrandizement of Athens and the extension and consolidation of her sway. Beginning as an ally, he in a few years reduced a portion of the confederate states to the condition of tributaries, and bound the rest to military service and a conformity of foreign policy. Upon each of the subject states he imposed a democratic form of government, and transferred important trials from the local courts to the tribunals of the capital. The annual tribute or contribution to the confederate fund, the custody of which had already been transferred from Delos to Athens, he raised from 460 talents ($500,000) to 600 talents, although the object of its establishment, namely, to resist a Persian invasion, no longer occupied the public mind. During his administration, 1,000 Athenians were settled in the Thracian Chersonese, 500 in the island of Naxos, and 250 in the island of Andros. He appropriated the Greek city of Sinope, on the shores of the Euxine, for the maintenance of 600 Athenian citizens. The islands of Lemnos, Imbros, and Scyros, together with a large tract in Eubœa, were covered with Athenian proprietors. Colonies were planted at Thurii in Italy, near the site of the ancient Sybaris, and at Amphipolis in Thrace. To the former, foreigners were invited from all parts of Greece.—The overshadowing influence of Pericles made him an object of envy, jealousy, and hatred. His public and private life were both in turn assailed. When the Peloponnesian war impended, the hostile faction succeeded in exciting the public mind against him to a dangerous pitch. But his influence continued predominant. An attempt, instigated by the Lacedæmonians, was made to sacrifice him on account of a taint of sacrilege in his family (see Alcmæon); but the attempt failed. His enemies tried to wound him through his friends. Anaxagoras, the philosopher, was indicted for impiety and banished. Aspasia was included in the same charge, but the pathetic eloquence of Pericles moved the dicastery to acquit her. Scandals were propagated with intent to sully his character in connection with this remarkable woman of genius. (See Aspasia.) But the machinations of his enemies were futile. They had Phidias indicted for embezzlement, but here again they were foiled. A charge of impiety followed; and in this they were too successful. The great sculptor was found to have introduced in his statue of Athena the portraits of himself and of Pericles among the figures on the shield of the goddess. But against Pericles himself, at whom in reality all these shafts seem to have been aimed, the malice of his enemies failed, and he continued, with one brief interruption, the idol of Athens down to the day of his death. He was bitterly denounced for his defensive policy in the first campaign of the Peloponnesian war; but his power and influence were too solidly established to be quickly overthrown. When in the second campaign the Peloponnesians reappeared in Attica, the plague began to rage at Athens. The people saw their lands laid waste by an enemy and their crowded city desolated by pestilence. Rage and despair seized them, and now at length they turned upon Pericles. Still Pericles stood firm. He sought to divert the public mind by a foreign naval expedition; and he himself took command of a fleet and devastated the coast of Peloponnesus. Returning, he found the public mind yet more incensed against him. He was charged with peculation, the object of his enemies being to make him ineligible for the office of general. The charge was maintained, and he was fined. But a reaction soon followed, and he was reëlected general, his enemies were foiled, and he regained all his popularity. More terrible calamities awaited him, the pestilence stripping him of many of his personal and political friends, and finally of his sister and his two legitimate sons, Xanthus and Paralus. But the Athenians loved him as a father; and to alleviate his woe, they legitimized a son named Pericles whom Aspasia had borne him, though it was their great leader himself who had proposed the law which excluded from citizenship all who were not Athenians on both the father's and the mother's side. Pericles fell a victim to the prevailing epidemic about a year afterward. When dying, he reminded those who stood around his bed, recounting his deeds, of one circumstance they had failed to notice, but which he considered more glorious than any service they had enumerated, namely, "that not a citizen of Athens had been obliged to put on mourning on his account."—Pericles was reserved, appearing in public but little, and yet he continued the idol of the people for 40 years of public administration, 25 years with others, and 15 alone. Plato extols his "majestic intelligence." Thucydides, his contemporary, says of him: "Pericles, powerful from dignity of character as well as from wisdom, and conspicuously above the least tinge of corruption, held back the people with a free hand, and was their real leader instead of being led by them. For, not being a seeker of power from unworthy sources, he did not speak with any view to present favor, but had sufficient sense of dignity to contradict them on occasion, even braving their displeasure." Eupolis, the comic poet, declares that "persuasion itself sat upon his lips." Aristophanes describes his eloquence as producing on the social elements the same effects that thunder and lightning produce on the atmosphere.

PÉRIER, Casimir, a French banker and statesman, born in Grenoble, Oct. 12, 1777, died in Paris, May 16, 1832. He was studying at a college of the Oratorians in Lyons at the outbreak of the revolution, when he rejoined his family at Paris. Having been drafted into the army, he served in the corps of engineers during the campaign of 1799-1800 in Italy. In 1801, on the death of his father, regent of the bank of France, he returned to Paris, and in partnership with his brother Scipion established a banking house. He was elected to the chamber of deputies, where he acted with the opposition, but saw with displeasure the revolution of July, 1830. He was the last minister appointed by Charles X., who hoped to retrieve his fortunes through his old opponent's popularity; but it was too late, and Périer was made one of a provisional committee of government. The revolution being completed, he was elected (Aug. 3) president of the chamber of deputies, which post he left to enter the cabinet as minister without a special department, but resumed it when Laffitte was made premier. He succeeded the latter, March 13, 1831, taking the department of the interior. He secured the independence of Belgium by sending a French army there in 1831 to oppose the invasion of the Dutch; ordered a French fleet to the mouth of the Tagus to assist in the overthrow of Dom Miguel; and occupied Ancona to check the progress of the Austrians in Italy. But at home the insurrectionary attempts of the legitimists or the republicans, the formidable revolt of the silk workers at Lyons, the indignant feeling of the people on hearing of the fall of Warsaw, and the growing spirit of liberalism, were difficulties with which he found himself unable to cope. Nevertheless, he devoted himself to his task to the last. In March, 1832, when the cholera broke out in Paris, he devised excellent measures to check its progress. He himself, in company with the duke of Orleans, visited the patients in the Hôtel Dieu, April 1. Five days later he was attacked by the disease, which at first appeared of a mild form, but soon resulted fatally. His funeral was attended by an immense concourse of people, and a monument was erected in his honor by public subscription in the cemetery of Père la Chaise.

PERIGEE (Gr. περι, about, and γη, earth), the opposite of apogee, and, as commonly understood, that point of the orbit of the moon where she is nearest the earth. The term is also sometimes used to denote that point of the orbit of the earth where it is nearest the sun; the sun is then said to be in perigee. It also signifies the least distance of a planetary body from the earth.

PERIHELION (Gr. περι, about, and ἡλιος, sun), that point of the orbit of a planet or a comet where it is nearest the sun. The distance of this point from the sun is called the perihelion distance of the body. It is opposed to aphelion.

PERIM, or Meyun, an island in the strait of Bab-el-Mandeb, in lat. 12° 39' N., long. 43° 25' E. It is 3½ m. long and 2½ m. broad, and divides the entrance of the Red sea into two channels called respectively the Great and Little straits. The former, between Perim and the coast of Africa, is 13 m. broad; and the latter, formed by the island and Cape Bab-el-Mandeb, on the coast of Arabia, is 1¾ m. Both straits are free from hidden dangers, but the little one is generally used by vessels passing to or from the Red sea. The island is a bare black rock, almost destitute of vegetation, and without water. On the S. W. side there is an excellent harbor about 1½ m. long and nearly ¾ m. broad, with a depth of 7 fathoms. As Perim commands the entrance to the Red sea, it has been twice occupied by the British. The first time was in 1799, when the French army was in Egypt, but the island was abandoned in 1801. Latterly the projected Suez canal has again alarmed the English for the safety of their Indian possessions, and they have once more established themselves on Perim. In Feb. 1857, it was formally taken possession of, and fortifications which command the little passage have been erected.

PERIODICAL LITERATURE, as the term is usually applied, comprises those serial publications the principal object of which is not the conveyance of news, but the circulation of interesting essays, tales, poems, and useful information of a literary, scientific, or artistic character. Periodicals are, furthermore, generally distinguished from newspapers by the greater care and reflection commonly bestowed upon their articles, and by their shape, which is always such that the numbers may be easily and conveniently bound and preserved in the form of books. Periodical literature embraces two classes of publications, the first devoted to literature or criticism, and the second to the sciences, the arts, or to special branches of knowledge. A few, however, present characteristics which would place them in both of these divisions.—The extension of knowledge and the multiplication of books rendered it impossible for the scholar to inform himself of the progress of learning in various countries, or to purchase and peruse more than a small portion of the works issued from the press; hence the necessity for critical journals. This literary want was first met in France. In Jan. 1665, Denis de Sallo, assuming the name of the sieur de Hédouville, issued at Paris the first number of the *Journal des savants.* He retired from the editorship in March, when 13 weekly numbers had been printed, in consequence of complaints made by the papal nuncio of the Gallican spirit displayed in some of the articles, and was succeeded by the abbé Jean Gallois, under whose supervision the journal was published at irregular intervals until 1672. Its publication was resumed by the abbé J. P. de la Roque in 1675, who was followed by L. Cousin in 1687. In 1701 it was placed under the protection of the chancellor of France, and a commission of learned men appointed to conduct it. It was interrupted by the revolution at the close of 1792, and an effort to revive it in 1797 was only so far successful that a volume of 394 pages was published; it was, however, permanently reëstablished in 1816, and still continues, and is conspicuous for its learning and candor. As the *Journal des savants* did not pay much regard to polite or amusing literature, J. Doneau de Visé founded in 1672 the second literary periodical in France, the *Mercure galant,* which gave reviews of poetry and the drama. Its title was changed in 1717 to the *Mercure de France,* and it was conducted with ability by Marmontel and others until 1818. It has since been revived for brief periods as the *Minerve Française* (1818–'20) and the *Mercure du XIX*^e^ *siècle.* In 1701 a society of Jesuits at Trévoux began the *Mémoires pour servir à l'histoire des sciences et des beaux-arts,* more commonly known as the *Mémoires de Trévoux.* It was characterized by the excellence of its critical judgments, and by the zeal with which it combated anti-Jesuitical opinions; it lasted until 1767. The other noteworthy literary journals of France in the last century were the *Année littéraire* (1754–'91) of Fréron; the *Décade* (afterward *Revue*) *philosophique* (1794–1807), by Ginguené; and the *Magasin encyclopédique* (1795), by Millin, the second series of which was styled *Annales encyclopédiques,* and the third *Revue encyclopédique.* It was suspended in 1832, when it was succeeded by the *Revue Française et étrangère,* by Jullien, of which only a few volumes were issued; and a second attempt by Didot to reëstablish it in 1846 as the *Nouvelle revue encyclopédique* was equally unsuccessful. In the present century the *Revue Française* (1828–'30 and 1837–'9), by Guizot, the *Revue de Paris* (1829–'46), the *Revue indépendante,* and many more have appeared and been discontinued. But the *Revue des deux mondes,* commenced in 1829, among whose most frequent contributors have been Ste. Beuve, Planche, Chasles, Rémusat, and De Broglie, has been marked by an ability which has made it permanent and placed it at the head of French critical serials. A rival publication, the *Revue contemporaine* (1852), with which has been united the *Athénéum Français,* is ably conducted by Calonne. The *Revue Britannique* (1825), edited by Saulnier and Pichot, and filled with translations from the periodical journals of Great Britain and the United States; the *Revue Germanique,* devoted to German literature; the *Revue des races Latines* (1857), appropriated to the arts and letters of those nations having a Latin origin; and the *Revue Européenne* (1859), are the other existing French reviews of note. To the admission of poetry and tales into the reviews, and to the publication by almost every newspaper of a literary *feuilleton,* must be ascribed the almost total want in France of serials exactly corresponding to the English magazines. A few only of the most popular kind, like the *Magasin pittoresque* (1832), exist.—England seems, with the exception of Italy, to have been the first country to imitate the example of France. But the "Weekly Memorials for the Ingenious," the earliest issue of which is dated in Jan. 1681–'2, lasted but a year, and some of its articles were translations from the *Journal des savants.* The "Universal Historical Bibliothéque" began in Jan. 1686, and expired in March. The "History of Learning" (1691, and again 1694), and the "Memoirs for the Ingenious" (1694), were also of brief duration; but the "History of the Works of the Learned" (1699–1711) was more successful, though the works reviewed are chiefly continental. A learned French Protestant refugee, Michel de la Roche, edited in London the "Memoirs of Literature" (1709–'14), and afterward in Holland the *Bibliothèque Angloise* (1717–'27) and the *Mémoires littéraires de la Grande-Bretagne* (1720–'24); but his "Memoirs of Literature" was recommenced in England in 1725. In 1728 the title was changed to the "Present State of the Republick of Letters," and Andrew Reid assumed the editorship. It underwent another transformation in 1737, becoming the "History of the Works of the Learned," which was continued until 1743. Its place was then to some extent supplied by the "Literary Journal" (Dublin, 1744–'9), the earliest publication of the kind in Ireland. Since the middle of the 18th century it has been generally customary in English literature to apply the word review to those serial publications whose province is criticism, magazine to those whose pages are filled with miscellaneous and entertaining reading, and journal to periodicals of the scientific kind. The earliest of the first named class was the "Monthly Review" (1749–1844), established by Griffiths, who continued to conduct it for more than half a century. It was followed within the next 50 years by the "Critical Review" (1756–1817), founded by A. Hamilton and supported by the contributions of Smollett, J. Robertson, and other writers; the "London Review" (1775–'80), succeeded by the "New Review" (1781–'96) of Maty, and incorporated in 1797 with the

"Analytical Review" (1788-'99), which was driven from the field by the "Anti-Jacobin Review and Magazine" (1798-1821), and the "British Critic" (1793-1843), edited at first by Nares and Beloe, who advocated the principles of the English high church party. At the beginning of the 19th century the "Edinburgh Review" (1802), by the style and critical ability of its articles, at once elevated the standard of this class of serial literature. (See EDINBURGH REVIEW.) It was a vigorous defender of whig policy, and soon had a formidable rival in the tory "Quarterly Review" (1809) of London, successively edited by Gifford, J. T. Coleridge, and Lockhart, and numbering among its contributors Scott, Southey, and Croker. The "Westminster Review" (1824), styled for a period the "London and Westminster Review," was started by Bentham and other utilitarians, and as the organ of the radicals in politics has maintained a high position under the direction of Bowring, Mill, and Hickson. The "Eclectic Review" (1805), in which papers by Adam Clarke, Robert Hall, and John Foster appeared, was evangelical in religion and liberal in politics; the "Christian Observer" (1802), edited by Z. Macaulay, C. Wilks, and others, is the organ of the moderate church party; and the "Dublin Review" (1836) was brought into existence by O'Connell and his friends as the representative of Catholic literature. Many able reviews have within a few years ceased to exist. Such are the "Foreign Quarterly Review" (1827-'46), which occupied itself, under the editorship of Gillies and Fraser, with foreign literature; the "British Review" (1811-'25); the "Retrospective Review" (1820-'26, and again 1853), which gave reviews of old books; and the "Irish Review" (1857). Their places have been filled by the "British Quarterly Review" (1845), successor to the "British and Foreign Review" (1835-'45), the "North British Review" (1844), the "New Quarterly Review" (1852), the "Scottish Review" (1853), the "London Review" (1853), the "National Review" (1855), and a few others. The reviews are generally printed quarterly, but the "Saturday Review" (1856), which combines political articles with critical notices of new publications, is a successful weekly; while the "Literary Gazette" (1817), "Athenæum" (1829), "Critic" (1851), and "London Review" (1860) are also hebdomadal journals of criticism, giving a portion of their space to literary intelligence.—The "Tatler" (1709-'10) and "Spectator" (1711-'12 and '14) traced out a new path in literature, in which many imitators, not only in England, but all over the continent, hastened to follow. Of the multitude of similar English publications, the "Rambler" (1750-'52) of Johnson was the most famous. The pleasing and popular papers of Addison and Steele created a large class of readers who were content with a less amount of erudition than was displayed in the pages of the critical periodicals, and whose chief desire was entertainment, or instruction in the garb of entertainment. Out of the want felt by this new public grew the English magazines, the earliest of which was the "Gentleman's Magazine," commenced in London by Cave in 1731, and continued after his death by Henry and Nichols, the editors assuming the pseudonymous appellation of Sylvanus Urban. Johnson and other eminent writers of the 18th century contributed to it; beside sketches and essays, it published for a time the proceedings of parliament; and it contains obituaries and much other historical matter, which has been made easily accessible to the investigator by the publication of 5 index volumes. It is still continued, but for many years its pages have been almost wholly devoted to history and archæology. Cave had a host of followers. The "London Magazine" (1732-'84), the "Royal Magazine" (1759-'71), the "Oxford Magazine" (1768-'82), the "European Magazine" (1782-1826), the "Scots Magazine" (1739-1817), the earliest in Scotland, and the "Monthly Magazine" (1796-1830), supported by the efforts of Priestley, Godwin, and others, were among the chief ones which originated in the 18th century. "Blackwood's Edinburgh Magazine" (1817) is of a higher order than any of its predecessors, and has never been excelled (see BLACKWOOD'S MAGAZINE); but the "New Monthly Magazine" (1814), edited in turn by Campbell, Hood, Bulwer-Lytton, and Ainsworth, "Fraser's Magazine" (1830), and the "Dublin University Magazine" (1832), have approached it in excellence. "Tait's Edinburgh Magazine," "Sharpe's London Magazine," "Bentley's Miscellany," and the "United Service Journal," which is partly devoted to the military sciences, are of a lighter character. A new era in this sort of literature has been introduced by the shilling magazines, of which "Macmillan's Magazine" (1859), the "Cornhill Magazine" (1860), edited by Thackeray, and "Temple Bar" (1860), by Sala, are the best, the last two having attained an enormous circulation. The "St. James's Magazine" is the newest of this class, having been established in April, 1861. The weekly magazines began in 1832 with the "Penny Magazine" (1832-'45) of Knight, and "Chambers's Journal." The former was not only very successful, owing to its illustrations and its cheapness, but it led to a crowd of imitations both in Europe and America. This popular class of journals, including the "Saturday Magazine" and "Family Herald," has of late been greatly improved, and far better examples of the kind are "Howitt's Journal" (1847-'9), "Household Words" (1850-'59), conducted by Dickens, "All the Year Round" (1859), by the same editor, "Once a Week" (1859), the "Leisure Hour" (1851), and many others. A peculiar department in periodical literature has been marked out and filled since 1849 by "Notes and Queries," which forms a medium of intercommunication for men of letters, and a repository for brief notes on curious topics in the various branches of literature. —In Germany a translation of the *Journal des savants* appeared at an early day, but in 1682 an original work, the *Acta Eruditorum*, was founded by two private learned societies at Leipsic. It was less brilliant, although by no means less erudite, than its French prototype; but being written in the Latin language, sternly orthodox in its Lutheran opinions, and governed by no systematic code of criticism or philosophy, it failed to exert the influence or attain the success of the Paris periodical. Supported by the contributions of men like Leibnitz, Seckendorf, and Cellarius, it continued until 1776. The first literary serials in the German language were written in the form of dialogues; they were the *Monatsgespräche* (1688–'9) of Thomasius, and the *Monatliche Unterredungen* (1689–'98) of Tenzel, who subsequently edited the *Curieuse Bibliothek* (1704–'7). The *Novellen aus der gelehrten und curieusen Welt* (1692) had but a brief existence, and the *Deutsche Acta Eruditorum* (1712–'56), an imitation of the Latin work, was the first really successful undertaking of the kind. Under the title of *Gelehrte Zeitung*, almost every large town had at some period during the 18th century its literary journal. Such, for instance, were established at Frankfort (1736–'86), Halle (1766–'92), Kiel (1771–'97), Gotha (1774–1804), Erfurt (1781–'96), and Erlangen (1790–'97). But more important were the *Neue Zeitung von gelehrten Sachen* (1715–'97), edited by Beck and others, and whose closing volumes are entitled *Literarische Denkwürdigkeiten;* the *Göttinger gelehrte Anzeigen*, begun in 1739 as the *Zeitungen von gelehrten Sachen*, whose editors, among others, have been Haller, Heyne, and Eichhorn, and which is still published; the *Allgemeine Deutsche Bibliothek* (1766–1806), founded by Nicolai; the *Briefe, die neueste Literatur betreffend* (1759–'65), in which Lessing, Mendelssohn, and Abbt took part; the so called *Bremer Beiträge*, through whose pages Gieseke, Zachariä, Gellert, Gärtner, and other critics exercised a powerful influence upon the German literary world; the *Allgemeine Literatur-Zeitung*, established by Bertuch at Jena in 1785, but removed by Schütz to Halle in 1804, and continued until 1848; and the *Jenaische allgemeine Literatur-Zeitung*, founded by Eichstädt at Jena upon the removal of the last named, and also suspended in 1848. In the last half century the *Leipziger Literatur-Zeitung* (1800–'34), the *Wiener Jahrbücher der Literatur* (1818–'48), *Hermes* (1819–'31), distinguished for its erudition, and the *Jahrbücher für wissenschaftliche Critik* (1827–'47) have ceased to appear. The leading existing critical authorities are the *Heidelberger Jahrbücher der Literatur* (1808); the *Repertorium der Deutschen und Ausländischen Literatur* of Gersdorf, a continuation of the *Repertorium der gesammten Literatur* (1834–'43); the *Deutsche Vierteljahrsschrift* (1838), modelled upon the English review; the *Gelehrte Anzeigen* of the Bavarian academy, and the above mentioned Göttingen periodical of the same name. Of a lighter and more popular tone are the *Blätter für literarische Unterhaltung* (1833), previously edited by Kotzebue as the *Literarisches Wochenblatt;* the *Deutsches Museum* (1852), by Prutz; the *Grenzboten* (1841), by Schmidt and Freytag; *Westermann's Monatshefte* (1855), and many more of the magazine kind. The *Illustrirtes Familien-Journal* of Leipsic is of the "Penny Magazine" school, and enjoys a very large circulation.—In 1668, three years after the appearance of Sallo's journal, the *Giornale de' letterati* was commenced at Rome by Nazzari, and published until 1679. Under the same title literary periodicals were afterward issued at Parma (1686–'90) by Roberti and Bacchini, at Venice (1710–'33) by the brothers Zeno, at Florence (1742), and finally at Pisa in 1771, which last has been continued, with the exception of a brief period (1797–1801), down to our own time. The *Biblioteca volante* (1676–1718, and 1733–'47), commenced by Cinelli and continued by Sancassani, was of a less solid character; but the *Novelle letterarie*, published for several years subsequent to 1740, and edited in part by Lami, was marked by much erudition. Distinguished at a later period have been the *Biblioteca Italiana* (1816–'40) of Milan, conducted at first by Acerbi; the *Antologia* (1821–'32) of Florence, under the direction of a society of scholars; the *Giornale Arcadico* (1819) of Rome, begun by Odescalchi; the *Giornale enciclopedico* 1806) of Naples, which was followed in that city by the *Progresso delle scienze* (1833–'48), and since by the *Museo di scienze e letteratura;* and several minor ones, like the *Poligrafo* (1811), and *Magazzino pittoresco*, and the popular *Album* (1824) of Rome. The chief critical serials at present are the *Rivista contemporanea* (1852) of Turin, resembling in style and appearance the French *Revue des deux mondes*, and the *Politecnico* (1839) of Milan, which was suppressed in 1844 and revived in 1859.—Spain was represented in periodical literature during the 18th century by the *Diario de los literatos* (1737–'47); the *Pensador* (1762), one of the "Spectator" school, and chiefly written by Clavijo; the *Seminario erudito* (1775–'91), by Balladeres, noted for its publication of rare and important literary manuscripts; the *Memorial literario* (1784–1807); and the *Variedades*, which acquired a considerable reputation under the management of Quintana. The *Cronica cientifica y literaria* (1824), by Mora, subsequently became a political sheet. The *Censor* (1820), by Lista, Hermosilla, and Miñano, was for some years the best periodical which Spain had seen; this was finally superseded by the *Revista Española* (1831), which successively changed its title to *Revista Europea* and *Revista de Madrid*. Later are the *Cartas Españolas* (1831), the *Antologia Española* (1848), the *Revista Hispano-Americana* (1848), edited by Mora for a brief period only, the *Revista de España*, the *Seminario pintoresco*, and the *Revista de* *ambos mundos.*—The *Jornal de Coimbra* in the earlier part of this century was the first, and for a long time the only, literary organ of which Portugal could boast. In 1837, however, the *Panorama* was founded, and still circulates largely both in Spain and Brazil; and in 1842 the very excellent *Revista universal Lisbonense* was established by Castilho, but is now edited by Ribeiro de Sá. Other publications of the literary class are the *Jornal da sociedade dos amigos das letteras* and the *Bibliophilo.*—In Holland two celebrated men, eminently qualified for the pursuit, entered upon the career of literary journalism in the latter part of the 17th century. The *Mercure savant* (1684) of Desbordes at Amsterdam was a feeble production; but Bayle in the same year began his *Nouvelles de la république des lettres*, which was continued with great success until 1718. He speedily found a rival in Le Clerc, who undertook in 1686 the first of the three famous series of reviews to which he is indebted for so much of his reputation. These were the *Bibliothèque universelle et historique* (1686–'93), the *Bibliothèque choisie* (1703–'13), and the *Bibliothèque ancienne et moderne* (1714–'27); they are characterized by fulness, variety, and judicious analysis and selection. The first periodical in the vernacular was the *Boekzaal van Europa* (1692–1708, and 1715–'48), by Rabus and Sewel, which was excelled by the *Republijk der Geleerden* (1710–'48). J. van Effen, imitating the English essayist, produced his *Hollandsche Spectator* (1731–'5) with marked success; but a new era in criticism was introduced in 1761 by the *Vaderlandsche Letteroefeningen*, which still continues. The *Algemeene Konst- en Letterbode* (1788) maintained for many years a high rank, but now exerts little influence. The *Recensent* (1803), lately superseded by the *Nieuwe Recensent*, has proved itself a powerful rival to the *Letteroefeningen*. Other existing periodicals are the *Nederlandsche Museum* (1835), the *Tijdstroom* (1859), and the *Navorscher* on the plan of the London "Notes and Queries."—The *Esprit des journaux* (1772–1818) is a Belgian literary miscellany of considerable value; but it was not until the separation from Holland that the periodicals of Belgium began to be of much interest. The *Messager des sciences*, edited for many years by St. Genois, is frequently quoted, while the chief issues in the Flemish tongue have been the *Nederduitsche Letteroefeningen* (1834), by Blommaert; the *Belgisch Museum* (1836–'46), by the well known scholar Willems; the *Kunst- en Letterblad* (1840–'43); the *Vlaemsche Rederyker* (1844), and one or two more popular miscellanies.—In Switzerland the *Bibliothèque Britannique* (1796–1815), and its more original successor the *Bibliothèque universelle* (1816), which is published in two parallel series, one scientific and the other literary, are widely circulated both at home and abroad. The *Revue Suisse* has been conducted with much success at Neufchâtel since 1837.—The earliest noteworthy literary journal of Denmark was the *Lærde Tidende* (1749–'65). Then came the *Minerva* (1785) of Rahbek, continued with a slight change of title until 1819; the *Danske Tilskuer* (1791–1808); the *Skandinavisk Museum* (1798–1803), revived as the *Litteratur Selskabs Skrifter* (1805–'32); and the *Lærde Efterretninger* (1799–1810), by Müller, ably continued by the same editor under the name of *Litteratur-Tidende* (1811–'36). Mölbech published the *Athene* (1813–'17) and other periodicals, one of which, the *Historisk Tidskrift* (1840), has survived him, and is now edited by Westergaard. The more modern journals are the *Tidskrift for Litteratur og Kritik* (1839–'42), now transformed into the quarterly *For Litteratur og Kritik* (1842); *Maanedskrift for Litteratur* (1829–'38); the *Nordisk Litteratur-Tidende* (1846); *Nord og Syd* (1848–'9), by Goldschmidt, revived in 1856, and now changed to the *Hjemme og Ude*; and the *Dansk Maanedskrift*, by Steenstrup, commenced in 1858. In 1854 the *Nordisk Universitets Tidskrift*, a well managed quarterly review, of which the numbers are alternately published in Swedish and Danish by the four Scandinavian universities of Copenhagen, Christiania, Upsal, and Lund, originated in the Danish capital.—The *Svenska Argus* (1732–'4), written by Dalin, a warm admirer of Addison, was the earliest notable addition made by Sweden to learned periodical literature. In 1742 Celsius founded the *Tidningar om den lärdas Arbeten*, which was afterward edited by Salvius and Gjörwell as the *Lärda Tidningar*; but the first comprehensive critical journal was the *Svenska Mercurius* (1755–'65) by Gjörwell. The *Vitterhets-Journal* (1777–'8), by Rudin and Ristell, scarcely deserves mention. The *Phosphoros* (1810–'13), by Atterbom and Palmblad, carried on by the latter as the *Svensk Literatur-Tidning* (1813–'24), and its adversary the *Iduna* (1811–'24), edited by a society styled *Göthiska Förbundet*, both wielded a powerful influence in the literary circles of Sweden, and originated two different schools of poetry and criticism. Among other periodicals may be mentioned *Polyfem* (1810–'12); *Svea* (1818–'32), noticeable for its elevated tone and clever reviews of foreign books; *Journal för Literaturen* (1809–'13), subsequently known as the *Allmänna Journalen* (1813–'23); *Skandia* (1833–'7); *Literatur-Föreningens Tidning* (1833–'6); and the *Literaturblad* (1838–'40). The best of a later date are the *Tidskrift för Literatur* (1850), by Malmström, and the *Nordisk Tidskrift*, by Solman (1852).—*Nor* (1840–'46), conducted by members of the Christiania university, and the *Norsk Tidskrift för Videnskab og Literatur*, established in 1847, and since edited by Lange, are the only especially prominent literary organs which have yet arisen in Norway. The periodicals published in the Icelandic language are not numerous. They comprise the *Sagnablöd* (1817–'26), edited by Finn Magnusson, and now issued under the name of *Skirnir* (1827); *Fjölnir* (1835–'45);

Ny Fjelagsrit (1841), a review edited chiefly by Jon Sigurdsson; and *Nordurfari* (1848–'9), by Gisli Brynjulfsson. In Finland the sole literary journal deserving of notice is the *Suomi*, which has been issued in the Swedish language since 1840.—The existing periodicals of Russia are more noted for their size than their number, a single issue sometimes containing 300 pages. Periodical literature in that country began with the *Yezhemyesyatchniya sotchineniya* ("Monthly Essays"), edited by Müller from 1755 to 1764. Soon afterward commenced Sumarakoff's "Industrious Bee" (1759), and Kheraskoff's "Leisure Hours" (1762). Superior to these, however, was the *Vyestnik Evropi* ("European Intelligencer"), founded in 1802 by the historian Karamsin, and subsequently (1808) edited by Zhukovsky. To this succeeded the *Ruskoy Vyestnik*, conducted from 1808 to 1820 by S. N. Glinka, then by Gretch and Polevoy, and which, after having been suspended for some years, was revived at Moscow in 1856 by Katkoff. One of the ablest publications was the *Sin otetchestva* ("Son of the Fatherland"), founded in 1812, with which was united in 1825 the *Severnoy Arkhiv* (1822), or "Northern Archives," at which time Bulgarin and Gretch became joint editors; the latter resigned it in 1839 into the hands of Massalsky, and a few years afterward it ceased to appear. The "Telegraph" of Moscow (1825–'35), by Polevoy, began a new era in Russian criticism; it was suppressed by the government, and its successor, Nadeshdin's "Telescope," speedily met with a similar fate. They were followed in the old capital of Russia by the *Moskvitanin* (1840), the organ of the Panslavic theories. The *Biblioteka dlya tchteniya* ("Library for Reading") owed its origin (1834) to Gretch, who was followed in the chair of editorship by Senkovsky; under the direction of Smirdin it is still one of the foremost periodicals of the country, although a portion of its contents consists of translations, chiefly from English works. The *Sovremennik* ("Contemporary"), founded by Pushkin in 1836, was afterward conducted by Pletneff; while the *Otetchestvennya zapiski* ("National Journal") was edited at first (1840) by Byedinsky, and then by Krajevsky, distinguishing itself under both by the zeal with which it opposed Panslavism. Outside of the country itself the *Archiv für die wissenschaftliche Kunde von Russland*, edited at Berlin by Erman since 1841, gives a valuable *résumé* of the labors of the Russian men of science and letters.—The *Dziennik Warszawski* ("Warsaw Journal"), founded by Mochnacki and Podczaszynski in 1823, has contained many excellent essays by such men of learning as Lelewel, Mickiewicz, and Brodzinski. An important periodical was edited by Lach Szyrma under the title of *Pamietnik Warszawski* ("Warsaw Memoirs"). The "Athenæum" was issued at the same place by Kraszewski, but expired at the end of 3 or 4 years; and a number of Polish literary serials have appeared at Wilna, Cracow, Posen, and Lemberg.—The principal literary periodical of Bohemia, the *Casopis Ceskmho Muzeum* ("Journal of the Bohemian Museum"), was begun in 1827 by the patriotic Palacky, edited from 1837 to 1842 by Schafarik, and since that time by Wocel. It has done much toward building up a vernacular literature.—In the south-Slavic lands, the *Danica Iliriyska* ("Illyrian Morning Star"), founded in 1835 by Gaj, lasted until the Hungarian struggle; and lately the *Glasnik Slovenski* ("Slavic Herald") has made its appearance at Klagenfurt.—Foremost in point of time among the serial issues of the Hungarian press was the *Magyar muzeum* (1788), started by Kazinczy, Szabó, and Bacsányi; but it soon expired, and Kazinczy for a while conducted the *Orpheus*. The *Tudományos gyüjtemény*, or "Literary Magazine," held from 1817 to 1841, under the editorship of Vörösmarty and others, the first place among Hungarian periodicals, but it had for a time a rival in the *Élet és literatura* ("Life and Literature"), originated in 1826 by Kölcsey and P. Szemere. The *Figyelmező*, or "Observer" (1837–'43), was an influential literary serial under the charge of Bajza, who in conjunction with Schedel also conducted the "Athenæum," an imitation of the London periodical of the same name, which enjoyed for a considerable time a deserved success. The *Erdélyi muzeum* ("Transylvanian Museum") of Döbrentei had only a brief existence, but the *Uj Magyar muzeum*, or "New Hungarian Museum," has during the last decennium been the principal critical journal of Hungary.—Ὁ Λογιος Ἑρμης ("The Learned Mercury"), the earliest periodical of modern Greece, was maintained by the contributions of Asopios and other prominent men. To it has succeeded the Ευρωπαικος Ερανιστης, or "European Contributor," established by Rangabé and others at Athens in 1840.—In India the issues of the periodical press are of course formed upon English models. The earliest one of a literary character was the "Calcutta Monthly Register" (1790), which lasted for some months. Of its successors the best known are the "Oriental Magazine and Indian Hurkaru," which began at Madras in 1819; the "Madras Miscellany;" the "Calcutta Review" (1844), a valuable existing quarterly; and the "Bombay Quarterly Review," which dates from 1855. At Singapore the "Journal of the Indian Archipelago" has been published since 1847, while the "Chinese Repository," begun by Morrison at Canton, was from 1832 to 1851 filled with valuable articles relating chiefly to the literature and history of the extreme East.—The periodicals of Spanish and Portuguese America have as yet hardly attained even a local success. Brazil did not possess a critical journal of the first class until Oliveira began in 1859 the *Revista Brasileira* at Rio Janeiro. Peru has nothing better or of a later date to show than the old *Mercurio Peruano* (1791–'5). The *Mercurio Chileno*, edited by Mora during the period of his exile from Spain, was a creditable production; and has been followed by one or two unsuccessful attempts to establish a permanent magazine in Chili. In Mexico the *Gaceta de literatura* of Ramirez (1788–'95) has scarcely been equalled since the establishment of the republic.—Reversing the rule which had prevailed in the old world, the United States, as was natural in a new country where scholars and institutions of learning were as yet few, had its journals of entertainment long before its journals of erudition appeared. The date of the first literary periodical is 1741. In that year Franklin issued the "General Magazine and Historical Chronicle" at Philadelphia, on the plan of the "Gentleman's Magazine;" but it existed only half a year, while the "American Magazine," begun in the same year and city by Webbe, was still less successful, two numbers only being published. The other issues of the kind prior to the revolution were mostly short-lived. They were the "American Magazine and Historical Chronicle" (Boston, Oct. 1743, to Dec. 1746); the "Boston Weekly Museum" (4 nos., 1743); the "Independent Reflector" (New York, 1752–'4), which numbered among its contributors Gov. Livingston and the Rev. A. Burr; the "New England Magazine" (Boston, 1758), which ceased after the appearance of a few parts; the "American Magazine" (Philadelphia, Oct. 1757, to Oct. 1758), published by Bradford; the "North American Magazine" (Woodbridge, N. J., 1758–'60), by S. Nevil; the "American Magazine" (Philadelphia, 1769), by Nicola; the "Royal American Magazine" (Boston, 1774–'5); and the "Pennsylvania Magazine" (Philadelphia, 1775), commenced with articles by Thomas Paine and others, but interrupted by the war. After the conclusion of peace and before the end of the century came the "Columbian Magazine" (Philadelphia, 1786–'9), edited at first by Carey, who abandoned it to undertake the "American Museum" (1787–'97), a compilation from the newspapers and other journals of the time, of much historical value; the "Massachusetts Magazine" (Boston, 1789–'96); the "New York Magazine" (1790–'97); the "Farmer's Museum" (Walpole, N. H., 1793), edited from 1796 until near the close of the century by Dennie; the "United States Magazine" (Philadelphia, 1796), by Brackenridge; the "American Universal Magazine" (Philadelphia, 1797); and the "Monthly Magazine and American Review" (New York, 1799–1800), founded by the novelist Brown, but carried on afterward as the "American Review and Literary Journal" (1801–'2). It would hardly be possible to give a complete list of the numerous literary miscellanies which have been undertaken since 1800 in the principal cities of the Union. A large majority of them never succeeded in obtaining any thing like success or permanence. Among them was the "Portfolio" (Philadelphia, 1801–'25), by Dennie, the first American periodical which was fortunate enough to reach an age of over 20 years; the "Literary Magazine" (Philadelphia, 1803–'8), by C. B. Brown; the "Monthly Anthology" (Boston, 1803–'11), containing articles by Tudor, Buckminster, J. Q. Adams, and G. Ticknor; the "Literary Miscellany" (Cambridge, 1804–'5); the "General Repository" (1812–'13), at the same place; the "Mirror of Taste" (Philadelphia, 1810–'11), by Carpenter, who paid much attention to dramatic matters; the "Monthly Register" (Charleston, 1805), the first southern periodical; "Literary Miscellany" (New York, 1811), by Baldwin; the "Analectic Magazine" (Philadelphia, 1813–'20), designed especially for officers in the navy, and edited in 1813–'14 by Irving; the "New York Weekly Museum" (1814–'17); the "Portico" (Baltimore, 1815–'19); Buckingham's "New England Magazine" (1831–'5); the "American Monthly Magazine" (New York, 1817–'18); the "Literary and Scientific Repository" (New York, 1820–'21); "Atkinson's Casket" (Philadelphia, 1821–'39), displaced at last by "Graham's Magazine," which from 1840 to 1850 was the best of its class in America; the "Atlantic Magazine" (New York, 1824–'5), by Sands, continued until 1827 as the "New York Review;" the "Southern Literary Gazette" (1825); the "New York Mirror" (1823), begun by Morris and Woodworth, the latter being succeeded by Fay, who gave place to Willis, from which time until 1842 Morris and Willis successfully conducted it; the "Illinois Monthly Magazine" (Vandalia, 1830–'32), the earliest publication of a literary character in the West, edited by J. Hall, who superseded it by the "Western Monthly Magazine" (Cincinnati, 1833–'6); the "American Monthly Magazine" (New York, 1833–'8), established by Herbert and Patterson, and subsequently edited by Park Benjamin; the "Gentleman's Magazine" (Philadelphia, 1837–'40), by W. E. Burton; the "Dial" (Boston, 1840–'44), edited during its first two years by Margaret Fuller, and afterward by R. W. Emerson, the organ of the school of New England transcendentalists; "Arcturus" (New York, 1840–'42), by C. Mathews and E. A. Duyckinck; the "Magnolia" (1842–'3); the "International Magazine" (New York, 1850–'52), under the editorial charge of R. W. Griswold; "Putnam's Monthly" (New York, 1853–'7), of a higher character, both in plan and execution, than any that had preceded it; and "Russell's Magazine" (Charleston, 1857–'8). All the early magazines drew largely from English sources, but in 1811–'12 appeared at Philadelphia the "Select Views of Literature," solely devoted to reprints from the foreign periodical press; it has been followed by the "Saturday Magazine" (Philadelphia, 1821), the "Museum of Foreign Literature" (Philadelphia, 1822–'39), the "Select Journal of Foreign Periodical Literature," edited by A. Norton and C. Folsom (Boston, 1833–'4), and by two existing publications, "Littell's Living Age" (Boston,

1844) and the "Eclectic Magazine" (New York, 1844). A multitude of magazines filled with light reading, and designed more particularly for circulation among the women of America, have been published, the earliest of which were the "Ladies' Magazine" (Philadelphia, 1799) and the "Lady's Weekly Miscellany" (New York, 1807–'8); later ones are the "Lowell Offering" (1841), chiefly written by female operatives in the New England factories; the "Ladies' Companion" (New York, 1820–'44); the "Columbian Magazine" (New York, 1844–'8); the "Union Magazine" (New York, 1847), by Mrs. Kirkland, afterward published at Philadelphia as "Sartain's Magazine;" "Arthur's Magazine" (Philadelphia); "Miss Leslie's Magazine" (Philadelphia); and the still issued "Godey's Lady's Book" and "Peterson's Magazine" of Philadelphia. Magazines for children appear to have originated with the "Young Misses' Magazine" (Brooklyn, 1806), and have been frequently published since under such titles as "Youth's Magazine," "Youth's Cabinet," "Parley's Magazine," and "Merry's Museum." The existing magazines of a higher order are the "Knickerbocker," founded by C. F. Hoffman at New York in 1832, and edited since 1834 by Louis Gaylord Clark; the "Southern Literary Messenger" (Richmond, 1835), edited for a brief period by Poe; "Harper's New Monthly Magazine" (New York, 1850), combining selections from foreign publications with a large amount of original matter, ably conducted from the outset, and having a circulation far beyond that ever attained by any similar publication; and the "Atlantic Monthly" (Boston, 1857), edited by J. R. Lowell, supported by original contributions from some of the foremost American and English novelists, essayists, and poets. Rather historical than literary have been the "American Register" (Philadelphia, 1806–'10), and periodicals of the same name by Walsh (Philadelphia, 1817) and by Stryker (Philadelphia and New York, 1848–'51), as well as the "American Quarterly Register" (Andover, 1829–'43), by Edwards. The "New England Historical and Genealogical Register" (Boston, 1852), by Drake, and "Historical Magazine" (New York, 1857), by Folsom, are also filled with American historical and biographical matter.—The review literature of the United States begins with the "American Review of History and Politics" (Philadelphia, 1811–'13), by Walsh; but the ablest and most permanent publication of this sort has been the "North American Review" (Boston, 1815), which has been successively edited by Tudor, E. T. Channing and R. H. Dana, Edward Everett, Sparks, A. H. Everett, Palfrey, Bowen, and Peabody, and has constantly maintained a high character both for style and critical ability. The "American Quarterly Review" (Philadelphia, 1827–'37); the "Southern Review" (Charleston, 1828–'32), by Elliott and Legaré; the "Western Review" (Cincinnati, 1828–'30), by Flint; the "New York Review" (1837–'42), established by Hawks, and subsequently edited by J. G. Cogswell and C. S. Henry; and the "Southern Quarterly Review" (Charleston, 1842–'52), were well conducted, but have been discontinued. The same fate has befallen the "Democratic Review" (New York, 1838–'52), afterward the "United States Review" (1853–'5), and subsequently revived by Florence and Lawrence as the "National Democratic Quarterly Review;" the "American Whig Review" (New York, 1845–'52), by Colton and Whelpley; the "Massachusetts Quarterly Review" (Boston, 1847–'50), by T. Parker; and the "New York Quarterly Review" (1852–'3). The "New Englander" began at New Haven in 1843, and the "National Quarterly Review" at New York in 1860. A large number of reviews, organs of the various religious bodies, are to be regarded partly as critical and partly as theological journals. Such are the "Christian Examiner" (Boston, 1824), a supporter of Massachusetts Unitarianism, edited at various times by Palfrey, Jenks, Walker, Greenwood, W. Ware, Ellis, Putnam, Hedge, and Hale, and which grew out of the "Christian Disciple" (1813–'24), conducted chiefly in the first instance by Noah Worcester; the "Biblical Repository and Bibliotheca Sacra," published under that name since 1851, formed by the union of the "Biblical Repository" (which originated in 1831, and with which was joined the "American Quarterly Observer," 1833–'5) of Edwards with the "Bibliotheca Sacra" of Robinson; the "Methodist Quarterly Review," commenced as the "Methodist Magazine" (1818); the "Biblical Repertory and Princeton Review," begun by Hodge in 1825 as the organ of the Westminster Calvinists; the "Christian Review" (1836), advocating in religious matters the principles of the Baptists; the "Protestant Episcopal Quarterly Review" (1854), and the "American Church Review" (New Haven, 1848); the "Universalist Quarterly" (Boston, 1843), by G. H. Emerson; the "Presbyterian Quarterly Review" (Philadelphia, 1852), by Wallace; the "Evangelical Review" (Gettysburg, Penn.), by Krauth and others; the "Universalist Quarterly Review" (Boston, 1844); and "Brownson's Quarterly Review," begun as the "Boston Quarterly Review" (1838), and since 1844 maintaining Roman Catholic opinions. Many of the colleges have individually published literary journals, of which the "Yale Literary Magazine" (1836) is the best known; but in 1860 several of the higher institutions of education in conjunction established the "University Quarterly Review." Minor critical journals have been the "Literary Review" (New York, 1822–'4), followed by Bryant's "New York Review and Athenæum Magazine" (1825), and its successor, the "United States Review and Literary Gazette" (1826–'7); and two or three periodicals in imitation of the London literary weeklies have been attempted, such as the "New York Literary Gazette" (1834-'5 and 1839), the "Literary World" (New York, 1847-'53), edited by Hoffman and the Duyckincks, "Norton's Literary Gazette" (New York, 1854-'5), and the "Criterion" (New York, 1855-'6).—Journals devoted to the sciences and the arts, or to particular departments of human knowledge, began to be published in the latter years of the 17th century, but were not numerous until the beginning of the 19th, since which they have multiplied with wonderful rapidity, until there is now scarcely any subject of interest, or which can be made an object of investigation, which has not its periodical organs. The "Philosophical Transactions" (London, 1665) and the *Miscellanea Curiosa* (1670) of Germany may be regarded as the first serials devoted to the natural and philosophical sciences; and, indeed, a liberal definition of the term scientific periodical would embrace the whole of those works issued, sometimes irregularly, sometimes at stated intervals, by the learned societies of Europe and America, and generally known as "Transactions." The first theological journal was styled *Das Alte und Neue aus dem Schatz theologischer Wissenschaften*, founded in Germany by Löscher in 1701; in America the earliest publications of the kind were the "Christian History" (Boston, 1743-'5) and the "Royal Spiritual Magazine" (1771). The first serial in connection with jurisprudence was the *Journal du palais*, established by Guéret and Blondeau at Paris in 1672. At the same place in 1683, the abbé de la Roque had already begun the earliest specimen of a medical periodical, the *Journal de médecine*. Philology was early represented by the *Aurora Philologica* of Boysen (Halle, 1715), and Germany has continued to be, above all other countries, the seat of journals devoted to linguistics. Journals of mechanical science seem to have originated in England, and the British publications of that class greatly excelled until within a few years those of the continent; but Germany within the last quarter of a century has possessed serials devoted to the interests of almost every trade and profession. Systematic periodicals, embracing the mathematical, natural, and physical sciences, sprang into existence about the close of the last century almost simultaneously in France and Germany, and have in general been both better conducted and more successful than those of a corresponding class in England. Agricultural periodicals have been especially objects of attention in France and America, while those of England and Germany are in general of less value and interest. Every civilized country now has its journals of theology, jurisprudence, medicine, the natural sciences, the mechanical sciences, and agriculture, while in some many other specialities are represented. Few, however, except those in French, German, and English, are of general interest beyond the confines of the languages in which they are written. The following list, therefore, is limited to those tongues; it gives the titles, place of publication, and date of establishment of the more prominent scientific and special periodicals now (1861) published:

AGRICULTURAL SCIENCES.

Annales de l'Agriculture Française. Paris, 1798.
Journal des Haras. Paris, 1828.
Journal d'Agriculture pratique. By Barral. Paris, 1837.
Journal des Cultivateurs. Paris, 1858.
Zeitschrift für Deutsche Landwirthe. By Stöckhardt. Leipsic, 1850.
Neue landwirthschaftliche Zeitung. By Gumprecht. Glogau, 1851.
Journal of Agriculture. Edinburgh, 1843.
Journal of the Agricultural Society. London, 1840.
Farmer's Magazine. London, 1833.
Country Gentleman. Albany, 1852.
Cultivator. New York, 1844.
Working Farmer. By Mapes. New York, 1849.
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PERI, the name of a class of imaginary beings in the Persian mythology, supposed to be descended from the fallen angels, and to be compelled to do penance for their sins before they can enter paradise. They are allied to the elves and fairies of the northern nations.

PERIPATETIC PHILOSOPHY. See ARISTOTLE.

PERIPNEUMONY. See PNEUMONIA.

PERITONEUM (Gr. περί, around, and τείνω, to stretch), the thin, transparent serous membrane which lines the abdominal cavity of man and vertebrates, reflected upon most of its contained organs and more or less completely enveloping them, and keeping them in place by its folds and prolongations. Like other serous membranes, it is a closed sac, covering but not containing the organs in its cavity; its internal surface, in contact with itself, is smooth and shining, moistened by a serous fluid which permits the natural movements of the organs upon each other. The folds which surround the small intestines, with their vessels, nerves, and glands, constitute the mesentery; this is attached to the vertebral column, retaining the canal in its proper place, and at the same time allowing the necessary motions of each portion; the folds which embrace the colon and rectum are called respectively the *mesocolon* and *mesorectum*. The double membranous fold, prolonged like an apron from the convexity of the stomach and colon, and floating free over and in front of the intestines, is the *omentum* or *epiploon*; it is supplied with numerous vessels, and is more or less charged with fat; it serves to keep the intestines in place, and to protect them and the vessels from external injury. In the male fœtus it sends a prolongation which accompanies the testis in its descent and becomes the *tunica vaginalis*, which in most cases is shut off from the peritoneal cavity and is the usual seat of hydrocele; in the female a small process enters the crural canal; the broad ligaments of the uterus are also peritoneal expansions. The kidneys and portions of other organs are outside of the peritoneum; it forms the ligaments of the liver and covers the lower surface of the diaphragm; its course upon the organs is very complicated. It is liable to common acute inflammation, exceedingly painful, and dangerous from its extent and connection with important organs; the puerperal state is subject to a speedily fatal form of peritonitis.

PERITONITIS, inflammation of the serous membrane which lines the cavity of the abdomen and invests the viscera which are contained in it. Acute idiopathic peritonitis is an affection so rare, that doubts have been raised as to its occurrence, the cases that have been described by authors being attributed to the rupture of an aneurism, or some minute perforation which has been overlooked in the course of the examination. But though peritonitis is one of the rarest forms of inflammation, there is not sufficient ground for this opinion. Dr. Simpson of Edinburgh has collected a number of instances in which peritonitis occurred during intra-uterine life; other observers have found it in new-born infants. Prolonged exposure to cold appears to be the only cause to which spontaneous peritonitis has been ascribed. The disease commonly commences with a chill more or less prolonged, and followed by heat of skin, frequency of pulse, and pain in the abdomen greatly increased by pressure. Sometimes the pain is constant, sometimes it is aggravated in paroxysms; at others it is increased by motion, and the patient commonly lies on the back with the knees drawn up, to relax the abdominal muscles and keep off the weight of the bedclothes. The respiration is hurried and is entirely thoracic, the abdomen being kept as still as possible; coughing, sneezing, &c., are extremely painful, and consequently suppressed; this is likewise the case with the effort to evacuate the bladder, and in the progress of the disease it is often necessary to have recourse to the catheter. In the commencement, in a few cases, particularly in muscular subjects, the abdomen is retracted; but very generally swelling of the bowels occurs. In the progress of the complaint effusion takes place into the cavity of the abdomen; but this is small in amount, and frequently cannot be detected during life. The bowels are generally very much constipated, though diarrhœa may be present. Hiccough and vomiting are apt to come on, the matters vomited being at first the contents of the stomach, and afterward a thin liquid in which a greenish substance is diffused. This last is often brought up in large quantities, and when vomiting once takes place it usually persists to the last. The disease when fatal is apt to be rapid in its progress, and death commonly occurs at the end of a few days, though it may be delayed much longer; its approach is heralded by extreme frequency and smallness of the pulse, and coldness of the extremities. Delirium is rarely present, the intellect being commonly clear to the last. On post-mortem examination more or less flocculent serum is found in the cavity of the pelvis or of the abdomen; the intestines are glued together by coagulable lymph, and the peritoneal surface is found to have lost its polish and become sticky. Where the patient recovers, the intestines are left matted or glued together, by which the peristaltic action may be materially interfered with, or fibrinous bands are formed which may cause strangulation of the gut.—Puerperal peritonitis, the most frequent form, occurs during child-bed, and commences with a strong and marked chill, which often lasts several hours. The pain at first is confined to the lower portion of the bowels, but as the peritonitis spreads it extends over the abdomen. Tympanitis is a marked symptom, and from the laxity of the walls of the abdomen, the swelling is often enormous; the pulse is very small and frequent, beating from 120 to 160 in a minute. The patient commonly lies on her back with the legs drawn up. Vomiting is apt to be early present, and the matters vomited, resembling a mixture of verdigris and water, are characteristic of the disease. The secretion of milk ceases, and the lochial discharge is generally suppressed. The disease is the scourge of lying-in hospitals and asylums, and sometimes occurs epidemically. Similar in its character to puerperal peritonitis is that form of the disease which sometimes, but rarely, comes on in menstruating women; here too, as in the former case, the disease appears to spread from the uterus to the peritoneum.—Next to puerperal peritonitis, that from perforation of the intestine is the commonest form of the disease. It may arise from perforating ulcer of the stomach, from the ulceration of Peyer's glands in typhoid fever, from that of phthisis or of dysentery, from the ulceration that sometimes supervenes in the appendix vermiformis, &c.; and occasionally it is caused by the rupture of a cyst, an abscess, or an aneurism. It is characterized by the sudden occurrence of acute pain in some part of the abdomen, which soon extends over its whole surface, is increased by pressure, and accompanied by a marked alteration of the pulse and the features. The disease is rapid in its course, the patient generally dying within 72 hours, though life in some cases has been prolonged beyond a week. Peritonitis is apt to arise in cases of ovarian cysts, of cancer and abscess of the liver, &c.; but the disease in these cases is commonly partial, and results only in the exudation of lymph and the gluing together of the adjacent surfaces of the membrane.—When general peritonitis occurs in a robust, healthy, young adult, the treatment may be commenced by a full general bleeding; in most cases the application of leeches to the abdomen, followed by the use of warm fomentations, will be all that is allowable. Main reliance in the treatment is often placed upon opium; this should be given at intervals of from half an hour to an hour, in such doses as will completely quiet the pain, and its use should be steadily persevered in until the termination of the disease. In this way a few patients have been cured whose cases seemed perfectly hopeless. Mercury, aconite, and *veratrum viride* have also been used successfully.—In some instances, and almost exclusively in tuberculous subjects, peritonitis puts on a chronic form. According to Louis, who has studied this subject with his customary accuracy, chronic peritonitis may be regarded as existing wherever: "1, the patient has suffered from general pain in the abdomen, not acute, but breathlessness and without diarrhœa; 2, an increase takes place in the volume and sonority of the belly, early accompanied by manifest fluctuation, without the existence of organic disease of the abdominal viscera, particularly of the liver, or of the heart or kidneys; 3, the more or less rapid subsidence of the effusion, leaving the belly slightly and generally swollen, permits the convolutions of the intestines to be seen distended in consequence of the difficulty with which their contents are passed onward; the whole attended by a weakness which can neither be accounted for by the condition of the lungs nor by the amount of the excretions." To the symptoms given by Louis we may add the dry crepitation on pressure noticed by Dr. Bright. The disease is generally fatal, though its course is a chronic one, and is very little influenced by treatment.

PERIWINKLE, in zoology, a pectinibranchiate gasteropod shell, of the genus *littorina* (*Férussac*). The shell is univalve, with a few spiral whorls, the horny operculum made up also of a few spiral turns; the tentacles are 2, the 2 eyes being at the base on the outside; the mouth is at the end of a proboscis, the gills comb-shaped, and the foot moderate, with a groove on the lower surface. The common periwinkle of the English and French coasts (*L. littoralis*, Linn.) is round, brown, longitudinally streaked with blackish; the shell is thick, and without pearly lining; it is oviparous, and lives in the lowest zone of sea weed between low and high water marks; immense quantities are brought to the London market, and form a considerable article of food for the poorer classes. The rough periwinkle (*L. rudis*, Mat.), from the ocean washing the shores of Europe, frequents a higher zone of sea weed; this is ovo-viviparous, and the young acquire a calcareous shell before they are excluded, for which reason the species is not eaten. There are many other species, all marine, inhabiting almost all parts of the globe, living on the rocks between the tide marks; three species are very common on the coast of New England, of small size, and probably never eaten.

PERIWINKLE (Ang. Sax. *pinewincle*; Lat. *pervinca*; Fr. *pervenche*), in botany, the common name of plants of the genus *vinca* (Linn.), of the natural order *apocynaceæ*. The plants of this order are perigynous exogens with no stipules, opposite and sometimes whorled leaves, and a somewhat corymbose inflorescence, with a free, 5-parted, persistent calyx; monopetalous, 5-lobed, deciduous corolla, with a contorted æstivation; 5 stamens arising from the corolla alternating with its segments; ovaries 1 or 2 celled and many-seeded; styles 1 or 2; stigma 1; fruit a follicle, capsule, drupe, or berry, double or single; seeds with a fleshy or cartilaginous albumen. The genera are principally tropical, a few representatives being known in northern latitudes. Among the latter is the *vinca*, the distinctive characters of which are: a 5-cleft calyx with linear acute segments, salver-shaped corolla with its tube longer than the calyx, throat bearded, segments of the limb flat, oblique, truncate at apex; stamens 5, inserted in the throat; stigma bearded, seated on a flat orbicular disk, which is grooved round the circumference; glands 2, alternating with the ovaries; fruit consisting of 2 follicles and few-seeded, dehiscing lengthwise; seeds cylindrical, naked, with fleshy albumen. The greater periwinkle (*V. major*, Linn.) has rather erect stems; ovate, acute, ciliated leaves; fine purplish blue flowers, the calyx with linear, subulate, ciliated divisions, the corolla with 5 broad obovate parts; the flowers appear upon short erect stems, while the long trailing ones are barren. There is a variety which is much esteemed for its variegated, yellowish-white striped and margined leaves. As a trailing evergreen this species is admirably adapted for covering the ground under hedges, ornamental trees, and shrubbery that has tall and bare stems. It flowers all summer. In the northern states it is commonly cultivated in large pots, which, placed upon pedestals, allow the long pendulous stems to hang gracefully down. It is easily propagated by the spontaneous rooting of its branches, chiefly at the tips or points, or by the division of its roots. If the seeds are needed, the plant should be kept in a shallow pot with very little earth and the lateral shoots cut away. The lesser periwinkle (*V. minor*, Linn.) has procumbent stems; elliptic-lanceolate, glabrous leaves; segments of the calyx linear-lanceolate, bluntish; segments of the corolla broadish at top; flowering stems usually erect; flowers blue with a white throat, varying to purple and white, and of much smaller size than those of the preceding. Both are found growing spontaneously in various parts of Europe. There are several beautiful varieties of the common or lesser periwinkle, such as a double blue-flowered, a double red-flowered, a single white-flowered of great delicacy of blossom, a yellow variegated-leaved, and a white variegated-leaved. The extreme hardiness of this species renders it acceptable for planting in shady places, where it covers the ground and produces a pleasing effect, increasing rapidly by its rooting stems. The herbaceous periwinkle (*V. herbacea*, Willd.) is an elegant plant of Hungary, with herbaceous prostrate stems, oblong-lanceolate, smooth leaves, stalked flowers, and a ciliate calyx; the corolla is of a pale blue color. The Madagascar periwinkle (*V. rosea*, Linn.) has an erect branching stem, ovate-oblong leaves, and twin sessile flowers of much elegance. There are two varieties, a pure white-flowered, and another with the same color set off by an eye or colored spot in the throat. These are fine pot plants, requiring much heat in winter, but doing well in a sunny open border during the summer.

PERJURY, the crime of false swearing. He commits perjury, who, under oath lawfully administered in a judicial proceeding or course of justice, wilfully gives false testimony material to the issue or point in question. The offence is thus defined at common law. In many of the United States it is particularly defined by statutes; but these do not vary materially from the common law definition. It is to be observed, first, that a judicial procedure or course of justice is essential to the commission of it. It may be stated generally that wherever, under the common law of the land, an oath is required in the regular administration of justice, there the crime is possible. The offence cannot be founded on the violation of a mere oath of office. For example, an officer, public or private, who neglects to execute his office in pursuance of his oath, or acts contrary to the tenor of it, is not indictable for perjury. Nor can perjury consist of the violation of an oath taken in any purely extra-judicial proceeding; as a false affidavit to an account to be rendered by an administrator, or false swearing before a justice of the peace, before whom no cause in any stage is pending. So, though false testimony, given before a commissioner appointed by a court under the common rule, is perjury, yet it is not so when given in depositions taken by consent before unauthorized persons. It matters not whether the untrue evidence were given in the principal investigation of the matter in issue, or whether it were in some preliminary or incidental proceeding. If the matter sworn to in these proceedings is material, though only remotely so, the crime of perjury is possible. Not only, therefore, may it be committed by a witness who is giving oral testimony in a trial in open court, but it may be as well in the preliminary information or complaint before a magistrate, or in statements made before the grand jury, or in a deposition made before a commissioner duly authorized to take it. So the examination of a poor debtor before a magistrate is a course of justice, and false swearing there is perjury. The hearing of a cause must furthermore be really, not apparently only, a judicial proceeding. For, if a judge who seemed to have authority, yet had none in fact, administered the oath, or if a suit, though properly brought, had yet in fact abated by the death of a party, and thus passed out of the court's jurisdiction, false swearing in either case is not indictable. But perjury is not excused if the pleadings were merely informal and amendable, or if the proceedings were voidable but not void. It is further essential that an oath was lawfully administered. The indictment therefore usually recites that the party was in due manner sworn and took his corporal oath to speak the truth. It is enough, however, to avow that the party was duly sworn, without alleging the mode in which the oath was administered. Yet, if the allegation be of a specific mode, a variance in the proof will be fatal; and perhaps the indictment would fail if it charged that the party was sworn, when in fact he only made solemn affirmation of the truth. The oath, as we have already impli can be well administered only by compet authority, and before a court or magistrate h ing legal right to proceed in the cause. suffices in the indictment to allege this competent power and authority without setting the facts which constitute jurisdiction.— proof of the falsity of the testimony, which also an essential element of the offence, it not requisite to recite the exact words uttere with the same nicety as in the case of forg or libel. It is sufficient to allege substanti what the defendant said as to the matter question, and that he knew it to be false. we have already seen, the untruth may lie only in evidence given in a court of law, it may lie in a false affidavit to a bill in eq which prays for an injunction, or to a petit for the writ of *habeas corpus*. The per may also consist in a false oath made under insolvent debtor's act, in false evidence gi before a grand jury, or in the false and m cious exhibition of articles of the peace. also well settled that the false testimony m be given wilfully. It has sometimes been h that the allegation of wilful and corrupt hood is well supported by evidence that th cused swore rashly to that which he did n know, and, though he believed it, yet had probable cause for believing. But the be opinion seems to be, that perjury is not c mitted if the party gave his testimony in cordance with his belief, no matter how care lessly or rashly that belief may have be formed. In other words, a distinct corr intent is essential to the crime.—Finally, th false testimony must be material to the p in controversy. The degree of materi is of no importance, nor is it necessary the false declaration immediately and dire touch the issue; it suffices if it rem or collaterally affect it. Perjury then may committed, if the testimony tend to increase or diminish the damages or punishment, or if concern the credibility of the witness hims or of any other witness in the case. A fa answer to a question put by way of cr examination may therefore lay the foundati of an indictment; and it has been held to be perjury where a party, after being particularly cautioned as to his reply, answered falsely to an interrogatory, put merely with the design of impairing his credit as to that part of the evidence which was immediately material.

PERKINS, Elisha, an American physician, the inventor of the metallic tractors, born in Norwich, Conn., in Jan. 1740, died in New York in Sept. 1799. He was educated by his father for the profession of medicine, and began the practice of it in Plainfield, where he was very successful. About 1796 he invented the metallic tractors, consisting of two instruments, one resembling brass and the other steel, but professedly of a peculiar composition of metals, 8 inches in length and pointed at the ends. They were used chiefly in local inflammations, such as pains in the head, face, teeth, and side, in rheumatism and diseases of a similar character, the points being applied to the affected part, and then drawn over it in a downward direction for about 20 minutes. For a time this method of cure enjoyed great reputation, not only in America but in Europe. In the United States the faculty of 3 institutions recommended it. In Copenhagen 12 physicians and surgeons, most of them instructors in the royal Frederick's hospital, began a course of experiments, an account of which was published in an 8vo. volume, and gave their opinion in favor of the new system, which they called Perkinism. In London, where the tractors were introduced by Dr. Perkins's son, a Perkinian institution, under the presidency of Lord Rivers, was established, chiefly for the benefit of the poor. The cases of cures published numbered 5,000, and were certified to by 5 professors, 40 physicians and surgeons, and 30 clergymen. The list of persons claimed to have been cured by this remedy amounted to an almost fabulous number; but the tractors fell into neglect almost as speedily as they had become celebrated. Dr. Perkins invented also an antiseptic medicine, and, anxious to test its efficacy against the yellow fever, he repaired to New York in 1799 during the prevalence of that disease; but after 4 weeks of unremitting toil, he himself died of the fever.

PERKINS, George Roberts, LL.D., an American mathematician and astronomer, born in Otsego co., N. Y., May 3, 1812. He was almost wholly self-educated, and at the age of 15 was employed as assistant engineer in the slackwater survey of the Susquehanna river; but his labors were interrupted by a severe lameness, which afflicted him for several years. At the age of 19 he was employed as a teacher of mathematics in the "Liberal Institute" at Clinton, N. Y., where he remained till 1838, when he became principal of the Utica academy. In 1844, at the opening of the state normal school, he was chosen professor of mathematics, and 4 years later was elected principal. In 1852 he was compelled by ill health to resign, and soon after superintended the erection of the Dudley observatory. In 1856 he was elected professor of mathematics in the university of the state of Iowa, but never entered upon his duties there. In 1856 he was appointed deputy state engineer and surveyor of the state of New York, an office which he still holds. He received from Hamilton college the honorary degrees of A.M. in 1839, and LL.D. in 1852. He is the author of a series of mathematical text books for colleges, academies, and public schools, comprising "Primary," "Elementary," "Practical," and "Higher" arithmetics, published between 1840 and 1851; "Treatise on Algebra" (1841); "Elements of Algebra" (1844); "Elements of Geometry" (1847); "Trigonometry and Surveying" (1851); "Plane and Solid Geometry" (1854). It is understood that he is preparing a text book on astronomy.

PERKINS, Jacob, an American inventor, born in Newburyport, Mass., in 1766, died in London, July 30, 1849. He was apprenticed to a goldsmith, and early distinguished himself by the invention of a new method of plating shoe buckles, in the manufacture of which he engaged with considerable success. When he was about 21 years of age he was employed by the commonwealth of Massachusetts to make dies for copper coinage. Soon afterward he invented a machine for cutting and heading nails at one operation, but he lost the fruits of this valuable improvement through the mismanagement of his partners, and was involved in great pecuniary distress. In bank note engraving he next made most important improvements, substituting steel for copper plates, and, having obtained an elaborate and costly impression, transferring this by pressure to other steel plates, which could be afterward hardened and used for printing from. (See Engraving, vol. vii. pp. 211, 213, 214.) About 1814 he went to Philadelphia and became associated with the firm of Murray, Draper, and Fairman, bank note engravers, and in 1816 went to England, accompanied by Mr. Fairman and a number of workmen, with the expectation of obtaining a contract for supplying the bank of England with plates. In this he was disappointed, but he obtained a similar privilege from the bank of Ireland, and in partnership with Mr. Heath carried on his business in London for a number of years. He also became interested in the subject of steam artillery, in which Watt and others after him had already made experiments with more or less success. Having constructed a gun in which steam, generated at an enormous pressure, was used as the propelling power instead of gunpowder, he instituted a series of experiments in the presence of the duke of Wellington and a number of artillery officers, which demonstrated the feasibility of his plan, though it has been generally condemned as inapplicable to modern warfare. An iron target, at a distance of 35 yards, was shattered to atoms. Balls passed through 11 planks of the hardest deal, each 1 inch thick, placed some distance apart, and with a pressure of only 65 atmospheres penetrated an iron plate ¼ inch thick. To demonstrate the rapidity with which the balls might be thrown, he screwed to a gun barrel a tube filled with balls, which falling into the barrel by their own weight were discharged at the rate of nearly 1,000 per minute. A movable joint being attached to the gun barrel and a lateral direction given to it, a lineal series of holes was perforated in a plank nearly 12 feet long. The expense of working such a gun was calculated at about $\frac{1}{50}$ part of the cost of the powder required to discharge an equal number of balls by the usual method. The greatest objections to the application of steam to artillery are, the impossibility of giving it the force of gunpowder, and the complex machinery required, which in actual battle could seldom be properly managed. Mr. Perkins also invented an instrument called the bathometer, to measure the depth of water, and the pleometer, to mark with precision the speed at which a vessel moves through the water; and he was the first to demonstrate that water is compressible.

PERKINS, Thomas Handasyd, an American merchant, born in Boston, Mass., Dec. 15, 1764, died in Brookline, Jan. 11, 1854. His father was a merchant. His early education was obtained at Middleborough, Barnstable, and Boston, and he was fitted for college at Hingham; but his love of a mercantile life was so strong that he was finally permitted to enter the counting house of the Messrs. Shattuck in Boston, with whom he remained until attaining his majority. He then spent some time with his elder brother James, and became associated with him in a mercantile house in St. Domingo. The climate proving prejudicial to his health, he returned to Boston, and attended to the interests of the house there, while a younger brother took his place at St. Domingo. In 1789 he went as supercargo of the ship Astræa, commanded by his relative Capt. Magee, to Batavia and Canton, and there laid the foundation of his subsequent extraordinary mercantile success, by forming a thorough acquaintance with the oriental trade. After his return he made, in connection with Capt. Magee, several successful ventures in the Pacific, on the north-west coast, and in China. In 1792 the insurrection in St. Domingo destroyed most of the property of his brother's house there, and, ruining their debtors, also brought them to the verge of bankruptcy. On their return to Boston, Mr. Perkins formed a partnership with his brother James, which for the next 30 years was remarkable for the extent, foresight, and success of its enterprises. In 1795 he visited France and Holland on business, and was detained in the former country some months, while the later scenes of the revolution were in progress. Here he had the opportunity of rendering important services to the wife and son of Lafayette, as well as to some of his own countrymen. In 1805 he was elected to the Massachusetts senate, and for 18 or 20 years subsequently he was most of the time a member of one or the other branch of the legislature. He was repeatedly offered a seat in congress or the cabinet, but he had no taste for political honors. In the promotion of all objects which could improve the physical, social, and moral condition of the community, Mr. Perkins took a lively interest. In 1815 the effort was made to endow the Massachusetts general hospital, and $100,000 was required within a limited time. Mr. Perkins's name was placed at the head of the first list of trustees, and he and his brother contributed $5,000 each toward the fund. In 1826 additions were to be made to the Boston Athenæum, and Mr. Perkins and his nephew each contributed $8,000 toward it, thus making up half the required sum. In 18
his mansion house and grounds in P
worth over $50,000, for a blind a
the Perkins institution and Massach
lum for the blind), on condition th
should be raised as a fund for its
When, in the last year of his life, an
made for a further endowment of t
næum, he subscribed $3,000; and wh
feared that the subscription of $120.0
danger of failing from the apparent im
ity of raising the last $40,000, he c
guarantee the amount.

PERM, a government of Russia, lyi
in Europe and partly in Asia, bound
Vologda and Tobolsk, E. by Tobolsk
Orenburg, and W. by Viatka. It exten
lat. 56° 18′ to 61° 55′ N., and from
30′ to 64° E.; extreme length 500 m.
450 m.; area, 130,000 sq. m.; pop.
2,012,308. The Ural mountains, wh
the boundary line between Europe
traverse it in a N. and S. direction,
the government into two unequal par
in Europe being the larger. Pavdinsk
men, the loftiest summit in the govern
more than 6,000 feet above the sea; a
principal pass across the Ural leads b
gur, between Perm and Tobolsk. Fro
principal chain the surface descends in a
of terraces, and a great part of it is mou
ous. The European portion belongs p
pally to the basin of the Caspian, and th
atic to that of the Arctic ocean. The K
an affluent of the Volga, enters the govern
from the N. W., and leaves it at the S. W.
ceiving many tributaries, the most imp
of which are the Vitchera, Kosa, Kosva,
and Tchusovaya. The E. part has several
and is drained by numerous tributaries of
Obi, the largest of which are the Sosva, L
Tura, Neiva, Irbit, Pishma, Iset, and M
The climate of the elevated regions and of
N. is cold and bleak. Gold, silver, platin
iron, copper, lead, diamonds and other prec
stones, loadstone, salt, and marble are
found. The S. W. part is generally fertile,
elsewhere the soil is better suited for past
than agriculture, and much of it is uncultivat
Rye, barley, oats, potatoes, flax, and differe
vegetables are grown. Oak, elm, cedar, pi
and larch are the chief trees. The mines a
extensively worked. In 1855 the 8 princi
mines belonging to the crown yielded 3,
lbs. of gold, 11,498 cwt. of copper, 8 lbs. 9
of platinum, and 59,311 cwt. of iron. Cl
leather, soap, glass, and candles are mad
About ¾ of the inhabitants are Russians, a
the remainder are composed of various Tarta
tribes, the descendants of the aborigines of the
country. By far the greater part belong to
the Greek church, but there are some of other
Christian sects, and about 4 per cent. are M
hammedans.—The capital, Perm, is situated on
the left bank of the Kama, in lat. 58° 1′ N., long.
56° 26′ E.; pop. in 1851, 13,262. The houses

chiefly constructed of wood. There are 9 [illegible], several public buildings, a convent, [illegible] hospitals, a gymnasium, a theological seminary, [illegible] extensive iron founderies, and copper refineries.

PERMUTATION. See COMBINATION.

PERNAMBUCO, an E. province of Brazil, bounded N. by the provinces of Ceará and Parahiba, E. by the Atlantic, S. by Alagoas and Bahia, and W. by Piauhi; extreme length 700 m., breadth 220 m.; area, according to the latest authority, about 52,000 sq. m.; pop. in 1856, 950,000. The coast is low and fronted by numerous coral reefs which render navigation dangerous. The country is flat with a sandy soil for about 15 m. from the sea, but it afterward becomes hilly, and gradually rises into mountains and extensive table-lands. The most important river is the San Francisco, which forms a part of the boundary on the S., and receives the drainage of the greater part of the province by several tributaries. In the N. E. the Capibaribe, Ipojuca, and some smaller streams flow directly to the ocean. Marble is abundant, and gold is found in small quantities. The soil is in many places rich and fertile, and produces sugar cane, cotton, maize, mandioc, fruits and vegetables, and many kinds of medicinal herbs. A great part of the mountainous country is covered with forests, which yield excellent timber, dye woods, balsams, and gums. The manufactures are trifling, but there are numerous sugar works and distilleries where many slaves are employed. Great improvements have been lately made in the roads of the province; and a railway is in course of construction which is to open the interior for about 300 m.—The capital, PERNAMBUCO, or RECIFE, is situated at the mouth of the Capibaribe, in lat. 8° 4′ S., long. 34° 52′ W.; pop. about 80,000. It consists of 3 distinct parts, Recife, Boavista, and St. Antonio, and of the town of Olinda, which is about 3 m. distant. Recife stands on a peninsula, Boavista on the mainland, and St. Antonio on an island or sand bank formed by the river. Recife is the principal seat of commerce. The streets are narrow, and the houses generally built of brick from 2 to 5 stories high. St. Antonio is connected with Recife by a long bridge. Boavista is the most modern quarter. The 3 divisions contain many churches, monasteries, charitable institutions, and other public buildings. The town is extremely dirty, and drinking water has to be brought in casks from Biberibe near Olinda. The harbor is formed by a reef which acts as a kind of breakwater, but in stormy weather the swell passes over and through different openings in it. The depth varies from 16 to 30 feet, but the best sheltered part has only about 10 feet. It has a good lighthouse and is defended by several forts. The trade of Pernambuco is very important, and has been steadily increasing for some years past. In 1859, 70 American vessels entered the port. The exports consist chiefly of sugar, cotton, rum, hides, and dye woods; and the imports of cotton and woollen cloth, hardware, cutlery, silks, wine, flour, salt fish, and pine boards. The chief imports from the United States in 1858 were 20,856 barrels of flour and 240,900 drums of codfish.—Recife was founded by the Portuguese early in the 16th century, was sacked by the English under Capt. Lancaster in 1595, and was in the possession of the Dutch from 1630 to 1654.

PÉRON, FRANÇOIS, a French traveller and naturalist, born in Cérilly, department of Allier, Aug. 22, 1775, died there, Dec. 14, 1810. He enlisted as a volunteer in 1792, was wounded at the siege of Landau, and made a prisoner at the battle of Kaiserslautern, and taken to the citadel of Magdeburg. He devoted his captivity to reading travels and histories, and was released in 1794. In 1800, through the influence of Jussieu and Lacépède, he was attached, in the capacity of zoologist, to the expedition sent by the French government under Capt. Baudin to explore Australia. He made curious experiments showing that the coldness of the sea water increases with the depth, and succeeded in bringing home an invaluable zoological collection, comprising more than 2,500 species previously unknown. The results of his observations have been embodied in his interesting narrative of the *Voyage de découvertes aux terres australes pendant les années* 1800–1804 (3 vols. 4to., with an atlas, Paris, 1807–'16). The 3d volume was prepared after his death by M. de Freycinet. He had previously published *Observations sur l'anthropologie* (Paris, 1799).

PÉROUSE, LA. See LA PÉROUSE.

PERPETUAL MOTION, a term the primary meaning of which is obvious enough, and which is in such sense applicable to actual phenomena, as the planetary movements; but which has been wrested from this, its proper use, to name any imaginary mechanism, such that, within itself, the power required to give it motion shall be continually restored or renewed, without aid from an exterior source or cause. Of course, such a machine, once in motion, must move for ever, or until destroyed by the wear of its parts. The idea necessitates a circle or circuit of parts, returning in some way upon itself; it implies the uninterrupted transfer of a certain quantity of motion from piece to piece through the circuit, or such accumulation at one point as shall overcome the resistance at another, so that an undiminished force returns always upon the first piece (prime mover), the machine being thus required to impel itself, and if possible perform over and above this some useful work. This problem, wrought upon through 2,000 years, and never more faithfully than within a century past, yet without one instance of positively attested success, has, aside from its demonstrated impossibility, deservedly attained to a "bad eminence" in the history of mechanics. Interminable have been the plans, devices, wheels, combinations, and engines to which these attempts, always in the nature of things absurd, have given birth. Two among the most distinguished of these attempts are that of the marquis of Worcester, 1659, and that of Jean Orffyre, or Orffyrens, a Frenchman, 1719; both these were wheels, moving by weights, their diameters 14 and 12 feet; but proof of their successful working remains insufficient.—First, what movements cannot be claimed as furnishing or solving the so called perpetual motion? The earth and other planets incessantly rotate and advance in their orbits; but the resistances they meet being 0, or infinitesimally small, no perceptible retardation results. By the first law of motion, they can never stop, save owing to some extraneous opposing force; and so, the air and gravity being removed, every ball propelled from a school boy's club must move forward with its first speed, in a right line and for ever. In truth, observation as yet reveals to us no body or particle of matter that is not in incessant motion through space. Thus, the real difficulty is not to find instances of perpetual motion, but to find any power adequate to arrest such motions. What the imaginative mechanist seeks is in no case a machine expected to go for ever; it is one that in time must wear out by the rub and grating of its parts; yet inconsistently, because ignorantly, he hopes to devise a machine that shall feed itself with needful power, and then yield a surplus with which to grind, saw, plane, &c. The continual movement of the tides; the use of a large tide wheel to fill a reservoir and feed constantly a smaller wheel; the turning of light wheel-work continually and rapidly by means of contrivances for reversing direction and multiplying velocity of movement of a piston rod resting on a body of oil in a tube, or of a long metallic bar fixed at one end, and due to small expansions and contractions of the oil or the bar; the oscillations of a pendulum aided by a spring; the incessant pulsation of the heart through 80 or more years—none of these afford the perpetual motion sought, because they are due to moving force from without, as to gravity, momentum, heat, elasticity, or finally to food. While oceans continue to evaporate, rains to fall, and rivers to return to the sea, by renewing our water wheels we secure perpetual power and work. But the over-ingenious busy themselves with projecting a water wheel that shall pump back to the top of the fall all the water required to run it, and meanwhile do some useful work beside. Now, any machinery is only a connected series of inert and inactive pieces, interposed between the point on which a motor acts and the material on which its work is to be done (see MECHANICS); and this being true, the supposition that the whole work of a machine shall far exceed, or in the least exceed, the whole power it can receive, is simply impossible and absurd. If it were possible, the only admissible cases must be those in which momentum due to inertia or to gravity, or attractions and repulsions, as of magnetic poles, can be made within the mechanism to do the work of propelling it. Viewed in any light, there are but 5 cases supposable: 1. An exterior moving power; but this is of course excluded. 2. Total annihilation of friction, resistance of air, rigidity, or softness when injurious, adhesion of parts to each other and of air to them all; but these conditions existing in the very nature and circumstances of bodies, to escape them is impossible. Their results are wear, and conversion of some of the force into heat; in either case, a definite and large subtraction from the total power. 3. Can the force generated or transmitted through any piece or connection be greater than that impressed upon or imparted to it by the pieces preceding it in the circuit? This might be supposed, if any ordinary machine had ever been found to yield a total work greater than the total power put upon it. In fact, the work equals the power; and part even of the former is waste work, expended on resistances. Positively, then, no part or connection of a machine can do what no entire ordinary machine can do—augment the total power. The urging body or piece always loses what the urged gains. M. De la Hire demonstrates that the problem of a perpetual motion in this aspect amounts to this: to find a body both heavier and lighter at the same moment; or to find a body heavier than itself; or to find a force greater than itself. 4. Is it possible, by any artful disposition and combination of contrivances, multiplied to any desired extent, to secure the end sought by successive accumulations of momentum within the parts? This appears more plausible, but only because the case is more complicated, and the law is here not so easily traced. In this direction the larger number of speculators have been led astray. The law applying here is that of virtual velocities: what is gained in the magnitude of effect of a power, is always lost in time; and *vice versa*. The very fact of a necessary circuit of parts forbids the gain that otherwise might occur by resolving the acting forces, or in any way restoring or adding momentum in some of the parts; in other pieces, if not at once, the equal reaction must have its effect. 5. Can a surplus of moving power be obtained by some succession of mechanical or electro-magnetic with magneto-electric apparatus? The recent discovery that the various other forms of force have each its exact equivalent in mechanical units (see HEAT), and that the conversion of forces either way is by equivalents, sets this question at rest, and shows that the law of equality of action and reaction is to be extended from simple mechanics to all moving agencies in nature. Thus it becomes a sure axiom of science, that there can be no self-impelled mechanism of human production. A knowledge of this truth would even now save the wasted time, talents, means, and peace of mind, if not even the sanity of thousands. In New York, in 1860, a mechanist having devised a modification of the fly-wheel, by which a single person could accumulate power enough, on coupling instantly, to move a heavy load, proposed to propel therewith by the power of one man a railway car. Mistaking a momentary for a permanent result, he believed that he had achieved the perpetual motion; and a gentleman more learned in civil than in mechanical law, before being warned of its necessary failure, expended on this contrivance nearly $3,000. The type of a vast number of these attempts, however, is a wheel, cylinder, or endless belt vertical over pulleys, so contrived that weights shall fall or roll out from the axis of motion, and press more, on the descending side, and then fall or roll in toward the axis, pressing less, on the ascending side; the aim being thus to get an excess of downward pressure. But calculation from a true drawing will always show a sufficiently greater proportion of the weights at any instant to be on the ascending side; and with inertia, concussion, and friction, the balance is always on the side of the resistances. One would let 15 feet of an endless chain glide down a vertical shaft turning on fine pivots on one side, while but 10 feet of straight chain rose on the other; while another would cause heavy balls to drop into pockets in the periphery of a wheel on the descending side, the balls to be discharged below, and then, by the excess of power gained, to be fed along and elevated in an Archimedes screw. In these, as in like devices, the actual and necessary result is a perpetual rest. At a leading patent agency in New York, it is stated that probably 15 persons apply yearly for patents for professed perpetual motions; considering the number of agencies, and the certainty that many projects of the kind are kept waiting for the "working model," without which they fail to be patentable, it is safe to conclude that the number of these contrivances at any time being planned or constructed must be, in the United States alone, many hundreds.—For an account of some of the remarkable attempts made in this direction during the present and two preceding centuries, see "Perpetuum Mobile, or Search for Self-Motive Power," by H. Dircks (London, 1861).

PERPIGNAN, a city in the S. of France, capital of the department of Pyrénées-Orientales, situated upon the right bank of the Tet, at its confluence with the Basse, 34 m. S. from Narbonne; pop. in 1856, 19,844. It commands the S. E. entrance to France from Spain by the Pyrénées, and is strongly fortified with a wall and fosse, and commanded by a citadel with a double line of defences, and a tall square tower or donjon. In character the city is Spanish. Its streets are narrow and dirty, and mostly shaded by awnings. The houses are semi-Moresque in style, furnished with wooden balconies and inner courts. Over the Basse there is a bridge of a single arch, and one of 7 arches over the Tet. The public buildings date from the Spanish period, and are built of brick or rolled pebbles. In the remains of the ancient university is the public library, which contains 20,000 volumes. The city has a theological seminary, a high school, a botanical garden, a government sheepfold for merinoes, two hospitals, manufactories of woollen cloth, hats, leather, soap, and soda, and a considerable commerce in red wines, liqueurs, brandy, oil, silk, wool, iron, and cork.—Perpignan is upon or near the site of the ancient Ruscino, a city of the Sordones. It was in ruins about A. D. 800, and near it sprang up an insignificant hamlet called then Corsch, which became the present city of Perpignan. It belonged, with the province, to the kingdom of Aragon, but was taken by the French in 1475, after having been reduced by famine. Restored to Spain in 1642, it was included in the cession to France of Roussillon in 1659. The Spaniards were defeated by the French under the walls of the city in 1794.

PERQUIMANS, a N. E. co. of N. C., bordered S. by Albemarle sound, and drained by Perquimans river; area about 200 sq. m.; pop. in 1860, 7,248, of whom 3,569 were slaves. It has a nearly level surface, and the soil is generally fertile. The productions in 1850 were 45,943 bushels of wheat, 418,255 of Indian corn, and 1,565 tons of hay. There were 3 saw mills, 2 grist mills, 1 tannery, 12 churches, and 375 pupils attending public schools. Capital, Hertford.

PERRENOT, ANTOINE. See GRANVELLE.

PERRON, ANQUETIL DU. See ANQUETIL-DUPERRON.

PERRY, the name of counties in 10 of the United States. I. A S. co. of Penn., bounded E. by the Susquehanna, and intersected toward the N. by the Juniata river and S. by Sherman's creek; area, 540 sq. m.; pop. in 1860, 22,940. Its surface is mountainous, the Tuscarora range forming its N. W. boundary and the Blue mountains the S. E., but much of the land is very fertile. The productions in 1850 were 190,607 bushels of wheat, 155,271 of Indian corn, 144,142 of oats, 16,690 tons of hay, 24,469 lbs. of wool, and 302,189 of butter. There were 48 grist mills, 45 saw mills, 5 woollen factories, 25 tanneries, 4 founderies, 2 newspaper offices, 40 churches, and 6,372 pupils attending public schools. It is intersected by the Pennsylvania railroad. Capital, Bloomfield. II. A central co. of Ala., intersected by the Cahawba river; area, 950 sq. m.; pop. in 1860, 27,727, of whom 18,208 were slaves. It has an undulating surface and fertile soil. The productions in 1850 were 934,116 bushels of Indian corn, 184,616 of sweet potatoes, and 24,524 bales of cotton. There were 6 grist mills, 5 saw mills, 8 tanneries, 20 churches, and 714 pupils attending public schools. Capital, Marion. III. A S. E. co. of Miss., intersected by Leaf river and Black creek, tributaries of the Pascagoula, and drained by their branches; area, 1,044 sq. m.; pop. in 1860, 2,606, of whom 788 were slaves. It has a broken surface and a not very fertile soil, covered with forests of pine. The productions in 1850 were 56,860 bushels of Indian corn, 44,-

980 of sweet potatoes, 88,000 lbs. of rice, and 388 bales of cotton. There were 6 churches. Capital, Augusta. IV. A central co. of Ark., bounded N. E. by the Arkansas river, and intersected by the Fourche la Fève, one of its branches; area, about 600 sq. m.; pop. in 1860, 2,465, of whom 303 were slaves. It has a diversified surface, and the soil is generally fertile, particularly near the streams. The productions in 1854 were 38,820 bushels of Indian corn, 256 of wheat, and 1,765 of oats. There were 2 saw mills and a grist mill. Capital, Perryville. V. A W. co. of Tenn., bounded W. by the Tennessee river, and intersected by Buffalo river, a branch of Duck river; area, about 400 sq. m.; pop. in 1860, 6,042, of whom 548 were slaves. Its surface is diversified, and the soil is generally fertile. The productions in 1850 were 395,535 bushels of Indian corn, 23,484 of oats, 16,051 of sweet potatoes, 940 lbs. of tobacco, and 41,686 of butter. There were 10 grist mills, a saw mill, a furnace, 2 tanneries, 21 churches, and 685 pupils attending public schools. Capital, Humphreysville. VI. A S. E. co. of Ky., drained by the North and Middle forks of the Kentucky river; area, about 700 sq. m.; pop. in 1860, 3,950, of whom 73 were slaves. It has a mountainous and rugged surface, the valleys being arable and fertile, and the higher lands adapted to wool growing. The productions in 1850 were 124,296 bushels of corn, 4,758 of oats, 2,669 lbs. of tobacco, and 11,288 of wool. There were 10 grist mills, 2 saw mills, and 7 churches. Capital, Hazard. VII. A S. E. co. of Ohio, drained by a number of small streams; area, 400 sq. m.; pop. in 1860, 19,679. It has an undulating surface and fertile soil. The productions in 1850 were 428,903 bushels of Indian corn, 160,048 of wheat, 101,591 of oats, 9,887 tons of hay, 104,526 lbs. of wool, and 261,806 of butter. There were 5 grist mills, 7 saw mills, 2 woollen factories, 2 newspaper offices, 61 churches, and 5,808 pupils attending public schools. It is intersected by the Cincinnati, Wilmington, and Zanesville railroad. Capital, Somerset. VIII. A S. co. of Ind., bounded S. and E. by the Ohio river, which separates it from Kentucky, and drained by Anderson's and other creeks; area, about 400 sq. m.; pop. in 1860, 11,857. It has a very hilly surface and a soil fertile along the streams. The productions in 1850 were 232,835 bushels of Indian corn, 33,475 of oats, 3,848 of wheat, 999 tons of hay, and 10,581 lbs. of wool. There were 5 grist mills, 9 saw mills, 3 tanneries, 1 newspaper office, 8 churches, and 476 pupils attending public schools. Capital, Rome. IX. A S. co. of Ill., intersected by Beaucoup creek; area, about 430 sq. m.; pop. in 1860, 9,552. It has a diversified surface, and much of the soil is fertile. The productions in 1850 were 363,300 bushels of Indian corn, 66,363 of oats, 15,988 lbs. of wool, and 119,079 of butter. There were 3 grist mills, a saw mill, a tannery, 5 churches, and 340 pupils attending public schools. It is intersected by the Illinois central railroad. Capital, Pinckneyville. X. A S. E. co. of Mo., separated from Illinois by the Mississippi river, and drained by several small streams; area, 430 sq. m.; pop. in 1860, 9,128, of whom 739 were slaves. It has a diversified surface and fertile soil. The productions in 1850 were 349,280 bushels of Indian corn, 65,895 of wheat, 42,916 of oats, 11,731 lbs. of wool, and 73,845 of butter. There were 7 grist mills, 4 saw mills, 3 tanneries, 14 churches, and 360 pupils attending public schools. Capital, Perryville.

PERRY, Matthew Calbraith, an officer of the U. S. navy, born in South Kingston, R. I., in 1795, died in New York, March 4, 1858. He was a son of Capt. Christopher R. Perry, U. S. N., and a brother of Capt. Oliver H. Perry. He entered the navy as a midshipman in 1800, and served under Commodores Rodgers and Decatur. In July, 1813, he was promoted to the rank of lieutenant, in which grade he performed much arduous service, particularly upon the coast of Africa, and in protection of commerce from pirates in the West Indies in the years 1821 and 1822. In March, 1826, he was promoted to be commander, and in 1837 to be captain. Beside serving a great deal on foreign stations, he took an important part in the organization of the steam naval service, and conducted a series of ordnance experiments. In 1838 he was ordered to Europe on special service connected with dock yards and lighthouse administration. He subsequently commanded the navy yard at Brooklyn, and the squadron on the coast of Africa, the frigate Macedonian bearing his flag. In 1846 he was appointed second in command of the squadron in the gulf of Mexico with orders to hoist a red broad pennant in the steamer Mississippi; and in March, 1847, succeeded Commodore David Conner in the command of that squadron, which he held until the close of the Mexican war, accomplishing the reduction of the whole gulf coast of Mexico, and occupying every point through which supplies could be sent into the enemy's country. All the operations of this important command were conducted by Commodore Perry with skill, and the most indomitable energy and perseverance. In March, 1852, he was appointed to the command of the Japan expedition, and negotiated a treaty with that exclusive government, which opened the way to the intercourse which now subsists between Japan and the United States. The interesting and important results of this expedition have been published in 3 vols. 4to. (Washington, 1856), and in two abridgments. He returned to the United States in 1856, and died while on special service growing out of the expedition.

PERRY, Oliver Hazard, an American naval officer, born in Newport, R. I., in Aug. 1785, died at Port Spain, island of Trinidad, Aug. 23, 1819. He entered the navy as a midshipman, April 7, 1799, and was first in active service under the command of his father, Capt. C. R. Perry, in the frigate General Greene, 28, which performed an active and important cruise on the West India station during 1799 and 1800. In 1802 he served in the Mediterranean in the frigate John Adams, Capt. Campbell, and again on the same station in 1804–'6 in the Constellation frigate and Nautilus schooner. In Jan. 1807, he was promoted to the rank of lieutenant, and in 1809 was in command of the schooner Revenge, 14, and cruised actively upon the coast of the United States until Jan. 1811, when the Revenge was wrecked upon Watch Hill reef near Stonington, Conn. A court of inquiry ascribed the accident to tides and thick weather, acquitting Lieut. Perry of all blame. At the opening of the war of 1812, Perry was in command of a division of gun boats at Newport, R. I., and in Feb. 1813, he was transferred, at his own request, with a portion of his officers and men, to the command of Commodore Isaac Chauncey on the lakes. In the following March he was ordered by Commodore Chauncey to superintend the equipment of a naval force on Lake Erie, and while thus employed at the port of Presque Isle (now Erie), he was called away for the moment to aid in an attack upon Fort George. He coöperated gallantly and ably with the army in that affair, at the head of a body of seamen. In Aug. 1813, Perry, taking advantage of the momentary absence of the British squadron which had been watching him, succeeded in getting the force which he had equipped out of the port by lifting the larger vessels on camels, and, though very deficient in officers and men, and imperfectly equipped, brought the British squadron to an engagement on Sept. 10, which resulted in the complete success of the American arms. (See ERIE, BATTLE OF LAKE, vol. vii. p. 270.) After this brilliant and important action, which raised Perry to the highest naval renown, he coöperated with the army of Gen. Harrison by assisting in regaining possession of Detroit, in transporting troops, and serving at the battle of the Moravian Towns. At the close of the operations of 1813, he gave up his command. Congress bestowed a gold medal upon him for his services, and he was promoted to the rank of captain, his commission being dated Sept. 10, 1813, the day of the battle. High civic honors were paid him wherever he went, and more than 40 counties, towns, and villages have been named after him in different parts of the Union. In Aug. 1814, he was appointed to the Java, 44, a new frigate under equipment at Baltimore; but as the Chesapeake was closely blockaded, it was impossible to get her to sea, and Perry, with his officers and men, was actively employed in annoying the British squadron in their descent of the Potomac from Alexandria, and in the defence of Baltimore. After peace was proclaimed he cruised in the Java upon the coast of the United States, and in the Mediterranean until Jan. 1816. In March, 1819, he was appointed to the command of a squadron for the coast of Colombia, and sailed from Annapolis on June 7 of that year in the John Adams, 24, which bore his flag. In July he ascended the river Orinoco in the schooner Nonsuch (one of the vessels of his squadron) to Angostura, the capital of Venezuela, where he was engaged several days in the transaction of business with the government. On leaving the river he was seized with yellow fever, which terminated fatally the day the Nonsuch arrived at Port Spain. A few years later his remains were transferred in a ship of war to his native place. On Sept. 10, 1860, a marble statue by Walcutt was erected, with imposing ceremonies, at Cleveland, Ohio, to the memory of Commodore Perry, near the scene of his great battle, by the citizens of that place.

PERSEPHONE. See PROSERPINE.

PERSEPOLIS (Gr., "city of the Persians;" Pers. *Istakhar*), one of the ancient capitals of Persia. It stood 35 m. N. E. of Shiraz, on a spacious plain now called Merdasht, near the confluence of the Medus and the Araxes (now Pulwan and Bendemir). The plain is naturally one of the richest and most beautiful in the world, and is surrounded on all sides by lofty mountains rising from the verdant level like islands from the ocean. At the foot of one of these mountains, which projects somewhat beyond the line of the range into the plain, is a high terrace of the most massive Cyclopean masonry, extending N. and S. about 1,500 feet, and from E. to W. about 800 feet. The whole however is not one level platform, but is divided into three great terraces, of which that to the S. is the smallest and lowest, rising only 20 or 25 feet from the plain, with a breadth of 180 feet. The great centre platform is nearly 800 feet square, and rises 45 feet above the level of the plain. N. of this is the third platform, about 550 feet in length and 35 feet in height. On the northern and central platforms are grouped various ruined edifices, which appear to have been palaces or temples, and are all that remain of Persepolis. The principal features they present are tall, slender, isolated columns, stately portals, and ruined walls covered by hundreds of sculptured figures of men and animals. The chief ruins are those of the great hall of 100 columns, the Chehil Minar or great hall of Xerxes, the palace of Xerxes, and the palace of Darius. The stairs which lead to these edifices are among the most remarkable of the architectural features of Persepolis, and are peculiar to the place. The finest of these is that which leads from the plain to the northern terrace. It consists of two double flights, each 22 feet wide, the steps rising only about 3½ inches, while they are nearly 15 inches deep, the ascent being so easy that persons on horseback go up and down without difficulty. Its whole style is colossal, as many as 6 steps being cut in one block of marble, and the stones of the perpendicular walls being also of immense size. There are several stairs leading to the summit of the terraces, most of which are ornamented with sculptures, representing colossal warriors with spears, gigantic bulls, combats with wild beasts, and processions bringing tribute. There are also many inscriptions on the stairs and the buildings, in three different classes of cuneiform writing, of which the Zend always occupies the prominent place. These inscriptions have been read by Lassen and Rawlinson, who have thus ascertained that all the most important works were constructed by Darius Hystaspis and Xerxes (521–465 B. C.). Of the largest of these structures, the great hall of Xerxes, or the Chehil Minar as it is called by the modern Persians, Fergusson, the eminent writer on architecture, says: "It was not only one of the largest but one of the most splendid buildings of antiquity. In plan it was a rectangle of about 300 feet by 350, and consequently covering 105,000 square feet (2½ acres); it was thus larger than the hypostyle hall at Karnak, or any of the largest temples of Greece or Rome. It is larger, too, than any mediæval cathedral except that of Milan; and although it has neither the stone roof of a cathedral, nor the massiveness of an Egyptian building, still its size and proportions, combined with lightness, and the beauty of its decorations, must have made it one of the most beautiful buildings ever erected, and both in design and proportion far surpassing those of Assyria, though possessing much of detail or ornament so similar as to be almost identical in style."—At the distance of 1½ miles from the ruins of Persepolis a valley about 2 miles in width opens into the plain of Merdusht; and in the gorge of this valley, just where it opens on the plain, stood the city of Istakhar, so famous in oriental story, and according to the Persians the oldest city in the world. Darius, soon after he ascended the throne, seems to have removed the seat of government from Pasargadæ, the old capital of Persia, to Istakhar, and to have commenced in the southern suburb of that city the building of the palaces and court quarter to which the Greeks gave the name of Persepolis. After the destruction of the Persian monarchy by Alexander (who is reported by some of the Greek historians to have set fire to the palaces of Persepolis at the instigation of Thaïs the courtesan, a statement not corroborated by the appearance of the ruins, which show no traces of fire), the city shrunk back to its original dimensions, and under its native name of Istakhar became celebrated in the subsequent history of Persia, and remained an important place to a comparatively recent period.—See Fergusson's "Palaces of Nineveh and Persepolis Restored" (London, 1851).

PERSEUS, a Grecian legendary hero, the son of Jupiter and Danaë. Acrisius of Argos, the father of Danaë, having been warned by an oracle that the son of his daughter would cause his death, shut her up in a strong room; but Jupiter came down through the roof in the form of a shower of gold, and became by her the father of Perseus. Acrisius caused the mother and child to be placed in a chest and cast adrift at sea. The chest floated to the island of Seriphus, where Perseus was brought up by King Polydectes; but the latter, anxious at last to get him out of the way that he might gratify his passion for Danaë, sent him to fetch the head of the gorgon Medusa. Having obtained from the nymphs winged sandals to bear him through the air, a magic wallet, and the helmet of Pluto which rendered him invisible, from Mercury a sickle, and from Minerva a mirror in which he could see the reflection of Medusa, since a sight of the monster herself would change him to stone, he accomplished his errand while the gorgons were asleep. On his way back he saved Andromeda from being devoured by a sea monster, and married her. (See ANDROMEDA.) Arriving at Seriphus, he found his mother pursued by the violence of Polydectes, whom he metamorphosed with all his guests into stone by means of the gorgon's head. He then returned with his wife and mother to Argos, and Acrisius, remembering the oracle, fled to Larissa. Perseus, following him in order to persuade him to return, is said to have accidentally killed him with a discus in the course of the games which the king of Larissa was celebrating in Acrisius's honor. Unwilling to return to Argos, he exchanged that kingdom with Megapenthes for the government of Tiryns. He presented the gorgon's head to Minerva, who placed it on her shield.

PERSEUS, or PERSES, the last king of Macedon, reigned from 178 to 168 B. C. He was the son of Philip II., or as others call him V., and before coming to the throne served with some distinction in the army. He persuaded his father to put to death a younger son, Demetrius, whom he suspected of entertaining ambitious designs. Immediately upon his accession he confirmed the treaty concluded by his father with the Romans, but began secretly to prepare for war, and endeavored to form alliances with the states of Greece. Hostilities were hastened by an attempt of Perseus to assassinate Eumenes, king of Pergamus, who had reported to the senate the warlike preparations of the Macedonians. The senators pronounced Perseus an enemy of the republic (172 B. C.), and the consul P. Licinius Crassus was sent with an army to invade his dominions. He met the Macedonians in Thessaly, where two slight engagements were fought (171), Perseus winning one and Crassus the other. The war lasted 4 years, with disadvantage on the whole to the Romans; but at last the avarice of Perseus alienated his allies, and on June 22, 168, he was signally defeated near Pydna by the consul L. Æmilius Paulus. He took refuge in Samothrace, where he soon afterward surrendered, and in the following year was carried to Rome to adorn the triumph of the victor. Æmilius however treated him kindly, and, when he was afterward cast into a dungeon by order of the senate, procured his removal to a place of honorable captivity at Alba, where he passed a few years and died, either of voluntary starvation, or, according to a less probable account, of enforced want of sleep. He left two young children, Alexander, who is said to have become a scribe to the municipality of Alba, and a daughter. His younger brother and adopted heir, Philip, died in captivity.

PERSIA (the native name of which is Iran), a country of Asia, bounded N. by Russian Armenia, the Caspian sea, and Toorkistan, E. by Afghanistan and Beloochistan, S. by the Indian ocean, S. and S. W. by the Persian gulf, and W. by the Turkish empire. It lies between lat. 25° and 40° N. and long. 44° and 62° 30′ E.; greatest length from N. W. to S. E. about 1,000 m., average breadth about 600 m.; area, about 500,000 sq. m.; pop. variously estimated at from 5,000,000 to 10,000,000. It is divided into 25 provinces. In the N. are Ghilan, Mazanderan, and Astrabad; in the W., Azerbaijan, Ardalan or Koordistan, Luristan, and Khoozistan; in the S., Fars, Laristan, and Kerman; in the E., Yezd, Tabas or Tubus, Ghayn and Birjoon, Toorshiz, Meshed, Damghan, and Semnoon and the Great Salt desert. These eastern provinces collectively constitute Khorassan. Central Persia or Irak-Ajemee comprises the provinces of Khamsah, Kasbin, Teheran, Hamadan, Koom, and Ispahan. The principal cities are Teheran, the capital, Ispahan, the former capital and still the largest city of the kingdom, Tabriz, Ooroomeeyah, Hamadan, Shuster, Kashan, Reshd, Balfroosh, Astrabad, Meshed, Nishapoor, Yezd, Bushire, Shiraz, Lar, and Kerman. Several of these cities are among the most famous of the East for wealth and magnificence, but the visitor from Europe or America is always greatly disappointed by their appearance, which at the present time offers little to the eye of the beholder but ruins, filth, and misery. The view of a Persian city from the exterior is usually monotonous and uninteresting. The low and irregular houses, built mostly of mud, resemble heaps of dirt more than human habitations. The dwellings of even the rich and powerful seldom exceed a single story, and are shrouded from sight by high blank walls. The only public buildings are mosques, colleges, and caravansaries, most of which are as mean as the dwellings. There are not many minarets or domes of magnitude, and few of these exhibit either elegance or grandeur. The only relief to the monotony of the view is afforded by the gardens, which are planted with forest and fruit trees, and to a greater or less extent are seen near all the towns of Persia. The traveller usually approaches these cities through a narrow and dirty lane bounded by decayed mud walls, and must pick his way among heights and hollows, the fragments of old buildings, and the pits which have supplied the clay for new ones. Entering the dilapidated gateway, he finds himself in a mean-looking bazaar, or perhaps among heaps of rubbish as filthy and confused as those outside. "Any thing more dismal can hardly be conceived," says Lady Sheil, describing her entrance into Tabriz in 1849. "The images of youth are not easily effaced; and the 'Arabian Nights' and 'Lalla Rookh' will hold their place in the memory whether it will or not. But once inside the gate of a Persian city, the charm is dissolved, the magician's wand is broken, and reality takes the place of romance, which is destroyed for ever. Half the city seemed depopulated; there were large spaces wholly vacant, with deep excavations on either hand, from which the earth had been dug to build houses. Dead dogs, and here and there a dead horse half eaten, offended more than one sense. The houses were frightful. Constructed of brown unburnt bricks, looking exactly like mud, and without a single window to the streets, they presented a most gloomy aspect. This is a general picture of a Persian town, and be it remembered that Tabriz is one of the best and richest cities in the whole kingdom." The wretched appearance of the outside of a Persian house, however, is not a just indication of the state of the interior. The dwellings are generally comfortable, and those of the richer classes are often of great size and contain very handsome and commodious apartments.—The principal ports of Persia are Balfroosh on the Caspian sea and Bushire on the Persian gulf. The other ports are of little consequence. There is a marked deficiency of good harbors on both the N. and S. coasts. The deficiency of rivers in so vast a country is still more remarkable; there is scarcely a navigable stream in the whole kingdom. The largest rivers are the Karoon, which flows into the Shat-el-Arab or United Tigris and Euphrates, the Aras or Araxes, and the Safid Rud or White river, which flow into the Caspian. While the greater part of Persia suffers from want of water, the northern provinces bordering upon the Caspian sea are as remarkable for the multitude of their streams as the rest of the country is for its aridity; but they are for the most part mere torrents, full in winter and nearly drying up in summer. A striking characteristic of the topography of Persia is the frequent occurrence of salt lakes, of which that of Ooroomeeyah is the largest. It is in the province of Azerbaijan, between lat. 37° 5′ and 38° 15′ N., at the height of 4,300 feet above the sea, and is 80 m. in length and 20 in breadth, with an average depth of 12 feet. It is fast drying up, and is bordered by large tracts covered with salt, with which its waves are intensely impregnated.—Persia has been called a country of mountains, but it is for the most part rather a high table-land, rising 3,000 or 4,000 feet above the sea, bounded on all sides except the E. by lofty ranges, preëminent among which is the mighty chain of the Elbrooz. This great range, striking off from the Caucasus, enters the kingdom at the N. frontier, which it covers with a gloomy mass of black peaks, and from Ardebil runs parallel with the S. shore of the Caspian sea to Astrabad. Thence it passes in an easterly direction to the N. of Meshed into Afghanistan and Toorkistan. A branch of the Elbrooz called the Sahund mountains strikes off from Lake Ooroomeeyah in a N. E. direction, and spreads in various clusters through Azerbaijan. Another branch is the Zagros range, which divides ancient Assyria from Media, and, splitting into a confused mass of ridges and valleys in Koordistan, continues southward under the appellation of the Luristan and Buchtiaree mountains along the western borders of the table-land, and after traversing Fars stretches along the Persian gulf at various distances from the sea as far as Gombroon near the S. E. corner of the kingdom. North of the Elbrooz and between it and the Caspian are the provinces of Ghilan, Mazanderan, and Astrabad, which are low, level, well watered, and fertile. The region between the S. boundary of the plateau and the Persian gulf and the Indian ocean is called the Dushtistan or "level country," and, with a breadth varying from 50 to 150 m., exhibits a succession of sandy wastes, occasionally relieved by a plantation of date trees and a few patches of cultivation in such places as are blessed with a rivulet or a copious well. From the principal ranges we have mentioned run a multitude of branches that cover the surface of Persia with a network of rocky lines. Among them are to be found plains and valleys which wherever moisture abounds are fertile, but where water is absent are deserts of sand or salt. The valleys at the southern foot of the Elbrooz are rich with verdure throughout the year, and on the slope of the mountains N. of Teheran is a tract 20 m. in length covered with gardens and groves and bearing the name of Sham'a-i-Iran, or "light of Persia." In the central provinces the valleys are generally level. In Azerbaijan they lie between a succession of eminences. Koordistan in the N. is little more than a cluster of mountains with an almost Alpine climate.—Salt deserts occupy a great part of the surface of Persia, and are many of them covered by a saline efflorescence which glitters vividly in the sunshine. The Great Salt desert, the most extensive of these tracts, lies in the centre of the country, and is 400 m. in length and 250 m. in breadth. The nature of this desert varies in different places. In some the surface is dry and produces a few plants, such as prefer a salt soil; in others it is marshy, and in others the earth is covered with a crust of salt. Over considerable tracts sand predominates, which in some places is so light and impalpable as to be extremely dangerous to travellers, who are sometimes overwhelmed and buried in the drifts raised by the wind. Here and there this desert is broken by inhabited oases, though by none of very great extent. The general aspect of the country is arid and dreary, the mountains being merely masses of bare gray rock, rising abruptly from the plain and unrelieved by trees or shrubs. The plains, even where they are not absolutely desert, are chiefly of barren gravel or clay, and for 10 months of the year are parched with heat. The only trees to be seen are in the gardens of villages or on the banks of the few streams where they have been planted for timber. The provinces on the Caspian sea, however, are exceptions to the general dreariness, and are as beautiful as wood, water, and grand and varied mountain scenery can make them.—Comparatively little is known of the geology of Persia. The Elbrooz mountains are supposed to possess a primitive character. Porphyry, colored with chlorite, and compact feldspar with green earth, are found in abundance in the torrent beds, with occasionally granite and mountain limestone. The branches of the Elbrooz, however, lose this primitive character, and may be generally described as follows: calcareous substances stretch along their eastern skirts; on their southern acclivities schistose rocks appear; clay intermingled with quartz occupies the middling and higher regions; while granite composes the lower tracts of their northern aspects. Traces of volcanic action are to be found in several parts of the Elbrooz range; the peak of Demavend, the highest of its summits, which, according to the latest measurements, rises 21,500 feet above the sea, is undoubtedly an extinct volcano; and the frequent earthquakes in the vicinity of the mountains indicate the existence of subterranean fires over a wide-spread region. The most interesting geological feature of the Elbrooz mountains is the turquoise mines, situated about 40 m. W. of Nishapoor. The base of the ridge where they lie is composed of white, gray, yellow, red, or brown porphyritic earth, interspersed with veins of brilliant red, disposed in hillocks, on the top of which rest beds of limestone or porphyritic conglomerates. The mines are opened in beds of porphyritic earth or rock, deeply tinged with iron, through which the turquoise is disseminated in veins, nodules, and irregular masses. Being full of flaws, it possesses no great mercantile value. The Sahund mountains exhibit great masses of calcareous conglomerate resting on a base of granite. Their summits are composed of porphyry, sometimes containing crystals of glossy feldspar and hornblende. Some of the lower hills intervening between these mountains and Tabriz are covered with blocks and pebbles of a dark blue rock containing calcareous matter. Iron is abundant in Persia, though it is little manufactured. Copper, lead, and antimony also abound, and salt, sulphur, and naphtha are produced in great quantities. Excellent coal is found in the Elbrooz, and also valuable varieties of marble.—The climate of Persia is so much modified by the elevation of the surface that, according to the traveller Kinneir, one may pass in a few hours from the air of Montpellier to the cold of Siberia. Demavend and the other highest peaks of the Elbrooz are covered with snow throughout the year. The winter on the great plateau is long and severe, and heavy storms of snow are common at this season. The heat of summer is intense. The English traveller Morier states that at Shiraz after the middle of June the thermometer was scarcely ever under 100° in the shade, and frequently rose to 110°. In the low lands on the Persian gulf the heat of summer is increased by the winds from the sandy deserts with which this region abounds, but the winter and spring are delightful. But notwithstanding the great extremes of the climate of Persia, and the sudden transitions from heat to cold, it is very healthy, with the exception of the low coasts of the Caspian, where from the superabundance of moisture and of vegetation fevers prevail. Throughout the greater part of the country rain seldom falls, and the air is dry and the atmosphere so clear that polished metal may be exposed to it without becoming rusted.—Notwithstanding the generally barren appearance of the land, the cultivated soil wherever it is supplied with moisture is exceedingly fertile. Small streams and canals are valued at high rates and produce extraordinary rents. Fraser mentions a canal employed to irrigate a fruit garden of which the water rent was nearly $10,000. The principal products of Persian agriculture are wheat, barley, and other grains, the wheat being as fine as any in the world. The vine flourishes in several provinces, and the grapes and the wine of Shiraz are celebrated in the poetry of the East. The rich provinces on the Caspian produce the mulberry in great abundance, and include silk and sugar among their chief staples. Cotton is produced in sufficient quantity to supply the wants of the people; and in Feb. 1861, the Persian ambassador at London stated in a published letter that sufficient cotton could be grown in the southern provinces to supply the wants of Europe. Among the other useful products of the soil are gum tragacanth, assafœtida, saffron, henna, madder, opium, indigo, and tobacco. Fruits are grown in great perfection and abundance. Dates are largely used as food, and those of Dalaki in the province of Fars are particularly celebrated for richness and flavor. Pomegranates, shaddocks, limes, apples, pears, apricots, and walnuts grow in perfection everywhere, and oranges on the low lands. The melons are the largest and finest in the world. Though trees are very scarce in the greater part of Persia, the mountains of the Caspian provinces are covered with forests of valuable timber, including oak, elm, beech, walnut, and boxwood. The licorice plant is found in profusion on the plain of Merdusht and near Shiraz. A plant resembling hemlock, with a rich dark green verdure and from 5 to 6 feet high, yields the gum ammoniac. Among the vegetables, carrots, turnips, cabbages, and beets are common. Flowers grow in great luxuriance, and there are many beautiful species native to the country. Wild animals abound in the desert, among them the lion, tiger, wolf, jackal, hyena, fox, wild boar, wild ass, wild sheep, and antelopes and deer in great variety. The wild sheep is strong and courageous, and has large, crooked, and twisted horns. The wild ass is shy and very fleet, outstripping the best horses. Among the domestic animals, the most common are the camel, cow, sheep, goat, ass, horse, and mule. The native horses are large and strong, and the breed has been much improved by intermixture with the Arab. They are remarkable for their powers of endurance, and some of them will carry their riders for a week together at the rate of 100 miles a day. Those of the best quality frequently sell for $1,000, and are used for plundering expeditions. From the prevalence of hot and arid deserts, camels are preferred as beasts of burden, though mules are much used among the mountainous regions. From the scarcity of trees in Persia birds are rare. Pheasants are found on the coasts of the Caspian, and pelicans and bustards on the shores of the gulf. Among the song birds are blackbirds, thrushes, and the bulbul or nightingale. The rivers contain few fish, but valuable fisheries are carried on upon the shores of the gulf and the Caspian.—The population of Persia consists of two very distinct classes, the settled inhabitants and the tribes who are called Eels, a Turkish word signifying clans. Some of these tribes have become stationary, and have devoted themselves to agriculture, though still preserving their union as tribe men; but the rest of them are wanderers, who with their families and flocks change their quarters each summer and winter in search of pasture to grounds more or less distant belonging to the tribe, and which cannot be encroached on by other clans. A clan or *eel* is ruled by its *sheik* or chief and by the heads of the different *teerehs* or branches of the tribe. To these chiefs the whole tribe is devoted with a patriarchal loyalty like that of the highlanders of Scotland to the heads of the clans. The tribes comprise 4 races, viz., Toorks, Koords, Leks, and Arabs. The first are invaders from Toorkistan, who from time immemorial have established themselves in Persia, and who still preserve their language. The Koords are not numerous in Persia, the greater part of the nation living in Turkey. They are supposed to be of Persian descent, and speak a dialect of the Persian language. The Leks are of genuine Persian blood, and are supposed to be descendants of the ancient inhabitants of the country. The Arab Eels are descended chiefly from the Mohammedans who conquered Persia in the 7th century, but they have lost their original language and become Persians both in speech and appearance. The Eels generally live in tents, and are distinguished for courage, manliness, and independence. They are however inveterate robbers, and their turbulence has for sev-people. Every morning the shah holds a public levee, at which complaints are heard and justice administered in the form of reward or punishment. His principal minister or grand vizier is a personage of great power and influence, and receives a salary of 42,000 tomans, equivalent to $100,000, annually; but he is always exposed like the meanest subject to capricious punishments, and holds his life at the mercy of the monarch. Beside the chief minister there are secretaries who preside over various departments of state and finance. The law, as in all Mohammedan countries, is founded upon the Koran and partly on traditions. The civil law is administered by the mollahs or priests, whose decisions are generally affected by bribes or personal considerations. Criminal cases are referred to courts appointed by the state. The ordinary punishments are fines and floggings. Capital offences are punished by strangling, decapitation, or stabbing, and great offenders are sometimes tortured to death. The revenue of the shah amounts generally to $8,000,000 or $9,000,000, and is principally derived from a tax on land. There are also taxes on gardens, vineyards, shops, horses, animals, and various kinds of goods, and in some provinces a poll tax on all males above 14 years of age. Small as the revenue is, considering the size of the kingdom, such is the cheapness of every thing in Persia that it is generally sufficient to meet the expenditures. A large army is maintained, part of it disciplined and officered by European adventurers. The regular infantry is nominally rated at 100,000 men, but does not in reality exceed 70,000. The best trained portion of the force is the artillery, which numbers 6,000 men. This arm of the service was found to be very efficient in 1860, in several severe conflicts with the nomadic tribes whose power has been broken by the present shah. The cavalry number from 30,000 to 50,000, and are well armed and mounted. They are said to be able to encounter in the field the Russian Cossacks, and to be superior to the Turkish irregular horse.—The earliest history of Persia, as it is related by the poet Firdusi, the only native historian of ancient times, is a mass of legends, mostly purely fabulous, though some doubtless have a basis of reality, in which figure the dynasties of Mahabad, of the Jaianians, of Shah Kaliv, and of Yessan, which seem to have been altogether mythical. Next succeeded the Pishdadyan dynasty, founded by Kaimurs, of which the most celebrated kings were Tahmuras, the reputed founder of Ispahan; Jamshid, the founder of Istakhar, a monarch much renowned in oriental story; Afrasiab I. and Afrasiab II., the latter of whom was defeated and dethroned by the national hero Rustam, who placed on the throne Kai Kubad, the founder of a dynasty of which the succeeding monarchs were Kai Kaus, Kai Khusrau, Luhrasp, Gashtasp, Bahman or Ardashir Dirazdast, Dara I., and Dara II. From the researches of recent European scholars it appears, however, that the true history of Persia, so far as it is authentically known, is as follows. At a very remote period a great Aryan migration from beyond the Indus entered Persia and Media, and continued for some centuries. At length, in the 9th century, that part of the Aryan emigrants which afterward formed the chief element of the Median nation encountered the Assyrians, who were then a great power on the Tigris, and after a long struggle were subdued by the Assyrian king Sargon in 710 B. C. About 633 the Medes led by Cyaxares revolted, and, having taken Nineveh in 625, laid the foundation of the Median empire. Cyaxares is the Kai Kabad of the native poets. To him succeeded Astyages, after whom reigned another Cyaxares, according to some the Darius of the book of Daniel, and the Kai Kaus of the Persians. His successor, Kai Khusrau, is the Cyrus of the Greeks, according to whom he was the chief of the tribe of Persians who inhabited Persis, the modern Fars, and were subjects of the Medes. About 559 Cyrus was acknowledged as sovereign of the united nation of Medes and Persians, in which henceforth the Persians had the predominance. He conquered Babylon, and founded a great empire. At his death in 529 he was succeeded by his son Cambyses, who added Egypt and a great part of northern Africa to the empire. During a tyrannical reign of 7 years he committed great outrages, not only on the Egyptians, but on the principal men of Persia. Among others, he put to death on suspicion of treason his brother Bardes, whom the Greek writers erroneously call Smerdis. At length in 522, while he was yet absent in Egypt, the magians or priestly aristocracy brought forward one of their own number named Gomates, whom they imposed upon the people as the murdered Bardes, to whom he bore some personal resemblance. The people, disgusted with the tyranny of Cambyses, readily accepted the usurper as king; and Cambyses, on learning the news of the revolt, committed suicide, according to the Behistun inscription, or according to the Greek writers died from a wound which he accidentally gave himself. After a reign of 8 months the usurper was detected and put to death by a conspiracy of Persian chiefs, one of whom, Darayavush, the Darius Hystaspes of the Greeks, was made king. Darius reigned 36 years, and considerably enlarged the empire, making extensive conquests in the east in the regions bordering on the Indus, and in the west carrying his arms into Europe and overrunning Thrace and Macedonia. In an attempt to subdue the Greeks his forces were completely routed at Marathon in 490, and 4 years afterward he died, and was succeeded by his son Xerxes, who renewed the invasion of Greece in person, and at first with a certain degree of success, but finally lost both his immense fleet and army at Salamis, Platæa, and Mycale, and was assassinated in 465. Six sovereigns bearing the names of Artaxerxes, Xerxes, and Darius succeeded, with the last of whom, Darius Codomanus, the Dara II. of the Persian historians, terminated the dynasty of Cyrus. Persia, which for two centuries had been the leading power of the world, with a dominion extending over an area of 3,000,000 or 4,000,000 square miles, and a population probably of several hundred millions, submitted to Alexander the Great, who invaded it in 334 with an army of 35,000 Greeks, and, after defeating the Persians in the great battles of the Granicus, Issus, and Arbela, became on the death of Darius (who was murdered in his flight from Arbela) the undisputed master of the empire. After the death of the Macedonian conqueror, his generals for several years disputed by force of arms the possession of his Asiatic dominions; but about 307 Seleucus Nicator became master of Persia, which he transmitted to his successors Antiochus Soter and Antiochus Theos. In the reign of the latter, about 256, the Parthians, a tribe inhabiting the north of Persia, who from remote times had been subject to the Persians, revolted under Arsaces and founded the third Persian dynasty, the Arsacidæ of the classic writers, the Ashkanians of the Persians, by whom Arsaces was called Ashk. This dynasty lasted till A. D. 226, under 34 monarchs, of whom little is authentically known, this period of nearly 5 centuries being the most obscure in the history of Persia. Their capitals were Seleucia and Ctesiphon, and the most celebrated events of their annals were their wars with the Romans, beginning about 53 B. C. with the invasion of their empire by Crassus, whose army was cut to pieces and he himself slain. Several long contests ensued, in which the Parthians were sometimes victorious and sometimes defeated, till in the beginning of the 3d century the victories of the Roman generals threw Parthia into such confusion that Artaxerxes, or Ardshir as he is called by the native historians, claiming to be a descendant of the ancient royal family of Cyrus, revolted and overthrew and put to death Artabanus V., the last of the Arsacidæ, and proclaimed himself sovereign of Persia with the title of Shahanshah or "king of kings," which is still assumed by the Persian monarchs. He also restored the ancient religion of Zoroaster and the authority of the magi, which had fallen into discredit. The dynasty which he founded, under the name of the Sassanidæ, consisted of 28 or 29 monarchs, and continued upward of 400 years. Among the most famous of these kings were Sapor or Shahpur, the son of Artaxerxes, who carried on a successful war with the Romans, in which he defeated and took prisoner the emperor Valerian; Sapor II., whose reign began with his birth, lasted 71 years in the 4th century, and was marked by bloody wars with the Roman emperors Constantius and Julian, the latter of whom was defeated and slain in the contest; Varanes V. or Bahram Gour, who was celebrated for his munificence and generosity, and for his successful repulse of a Tartar invasion; and Chosroes or Khosru Nushirvan, who is considered by the Persians a model of justice, generosity, and sound policy, and who was both a great ruler and great conqueror, compelling the emperor Justinian to a disgraceful peace, and advancing the Persian arms to the Mediterranean on the west, beyond the Oxus and the Indus on the east, and into Arabia on the south. His reign of 48 years, from A. D. 531 to 579, was the golden age of modern Persia, according to the native poets and historians. His grandson, Khosru Parviz or Chosroes II., who succeeded him after an interval of two short reigns, is also famous for his conquests, which extended through Syria and Palestine into Egypt, and even to Tripoli and Carthage, while at the same time and subsequently his victorious armies were for 12 years encamped near Constantinople. He is still more celebrated in the East for his luxury and magnificence, and oriental history abounds in tales of his palaces, his superb thrones, his immense treasures, his unrivalled poets and musicians, his 50,000 Arab horses, and his 3,000 beautiful women, the most lovely of whom was Shirin or Irene, a Greek and a Christian, whose beauty and whose love form the subject of a thousand poems. His favorite residence was Dastagerd, E. of the Tigris, and about 60 m. from Ctesiphon. The latter years of his reign were unfortunate and inglorious. The emperor Heraclius, suddenly rousing from the sloth and self-indulgence which had hitherto marked his life, invaded Persia with a powerful army, and in 6 years Chosroes was stripped of all his foreign conquests, his famous palace at Dastagerd was plundered and burned, and finally he himself was dethroned and murdered by his eldest son Siroes or Sheruyeh in 628. From this time till the accession of Yezdegird III. in 632, Persia was given up to anarchy. The Mohammedan Arabs were already attacking the empire, and Yezdegird in vain attempted to stem the tide of armed fanatics that poured from the adjacent deserts. On the plains of Nahavand in 641 a great battle, in which 100,000 men are reported to have fallen, decided the fate of Persia. The defeated monarch, flying from the field, took refuge in his eastern provinces, where for several years he wandered a fugitive till in 651 he was murdered by a miller, and with him ended the line of the Sassanian kings and the religion of the magi. After horrible massacres the people, persuaded by the sword, embraced Mohammedanism, only a small, obscure, and persecuted remnant daring to adhere to the ancient faith of Persia. (See Guebres.) For the next two centuries Persia was subject to the caliphs. But in 868 an adventurer named Soffar, who had been a pewterer and afterward a bandit, gathered a native force and expelled the viceroys of the caliph. He founded a dynasty known as the Soffarides, of which three more princes maintained a precarious authority, till in the beginning of the 10th century Persia was divided between the families of Samani and Dilami, the first of which reigned over eastern Persia and Afghanistan, and the second over the rest of the country. Under these dynasties Persia fell beneath the yoke of the Seljooks, and was ruled by Togrul Beg, Alp Arslan, and Malik Shah, all of whom were conquerors greatly celebrated in oriental history. Their dynasty declined and perished in the 12th century, and after a long period of anarchy Persia was overrun and conquered by the Tartars led by Hulaku Khan, the grandson of Genghis, who established the seat of his empire at Maragha in Azerbaijan. The next important event in the history of Persia was the conquest and devastation by Tamerlane toward the end of the 14th century. Under his successors civil war almost continually prevailed, until in the beginning of the 16th century Ismael, a descendant of a famous saint, Sheik Suffee, succeeded in making himself master of the kingdom and founded the Suffavean dynasty. He died in 1523, and was succeeded by his son Tamasp, whose reign of 53 years was eminently prosperous. Abbas, the successor of Tamasp, was a still greater sovereign, though to his own family he proved a sanguinary tyrant. After his death in 1628 the Suffavean dynasty gradually declined, and was at length overthrown by the Afghans, who conquered Persia in 1722, and ruled it for 7 years with horrible tyranny, till they were expelled by the celebrated Nadir Shah, who in 1736 himself ascended the throne. His reign was memorable for success over foreign enemies and for bloody cruelty to his family and people. After his death a series of revolutions occurred from conflicting claims to the throne, and order was not fully restored till the close of the 18th century, when Agha Muhammad Khan became shah, and partly by policy and partly by cruelty succeeded in quelling the spirit of rebellion. His successors were Fath' Ali Shah, who died in 1834, Muhammad Shah, who died in 1848, and Nasureddin, the present shah. The principal events in their reigns have been wars with Russia, the first of which terminated in 1813 and the second in 1828, both of them disastrously to Persia, which lost successively the provinces of Georgia, Mingrelia, Erivan, Nakkshivan, and the greater part of Talish, the Russian frontier being advanced to Ararat, and the left bank of the Aras; and a war with England, which began in 1856 by a quarrel with the English minister at Teheran about a woman with whom he was accused of living in adultery, and terminated March 4, 1857, after repeated victories of the English troops in the south of Persia under the command of Generals Outram and Havelock.—See Sir J. Malcolm's "History of Persia" (2 vols., London, 1815); "Historical and Descriptive Account of Persia," by James B. Fraser (Edinburgh, 1834; New York, 1836); "Glimpses of Life and Manners in Persia," by Lady Sheil (London, 1856); "Outram and Havelock's Persian Campaign" (London, 1858). The novels of James Morier, "Hajji Baba," "Zohrab," "Ayesha, the Maid of Kars," and "The Mirza," are excellent illustrations of Persian society, character, and scenery.

PERSIA, Language and Literature of. In treating the Persian language we have to consider not only the modern Persian, the spoken and written dialect of the Persian people during the past 9 centuries, but also those more ancient idioms once prevailing in or near the same territory, which are most intimately connected with this modern language, as older forms of it. We shall thus have to treat of 5 dialects, viz.: 1, the Achæmenian Persian, or Old Persian, the language of the cuneiform inscriptions; 2, the Avestan, Zend, or Old Bactrian, the language of the Zendavesta, the Bible of the Zoroastrian religion; 3, the Huzvaresh or Pehlevi; 4, the Parsee; 5, the modern Persian itself. These form together a well marked group of closely related dialects, classifiable as the Iranian branch of the Aryan division of the Indo-European family. The name Aryan is sometimes applied to the whole family, but is much more properly restricted to that principal division of it which includes the Indian and the Persian languages, or the Sanscrit and its dialects and derivatives on the one side, and those languages which we have mentioned above on the other. The word is one which both peoples have applied to themselves as their distinctive title (Sansc. *ârya*, Avestan *airya*), and the most ancient forms of their respective languages, as we shall see below, are hardly more than dialects of a single tongue. Iran is a further derivative from the same word (Av. *airyana*), and is usually and properly employed in a wider sense than Persia (which fairly belongs only to the S. W. province of the Persian kingdom, containing Shiraz and the ruins of ancient Persepolis), to designate the whole territory extending from the highlands that overlook the Tigris to those that border the Indus, and to the Bolor Tagh, or from the Persian and Arabian gulfs northward to the Caucasus, the Caspian and Aral seas, and the river Jaxartes; a territory which has been mainly occupied from the earliest times by a homogeneous people, of kindred language, religion, and institutions. The Persian or Iranian group of languages is one of very high interest to the philologist and the historian, from the variety of the dialects and the long history of linguistic development which they illustrate, from the marked value of the literary and historical monuments which they contain, from the importance of their modern representative, its wide extension and refined culture, and from the prominence of the Persian race during 2,000 years of the world's history. There are several other languages beside those mentioned above which stand in a near relation to the Iranian group, and are by some authorities included in it; they are the Koordish, the Afghan or Pushtu, the Beloochee, the Ossetic in the Caucasus, and the Armenian. But their relationship to one another and to the Persian is of a much more distant character; nor would there be any propriety in treating them under the head of Persian. I. *The Achæmenian Persian, or Old Persian.* This appears to have been the language of the S. W. part of the Iranian territory, or of Persia proper, during the period of widest extent and greatest power and glory of the Persian empire, under Darius the Achæmenian, son of Hystaspes, and his successors (520 to 330 B. C.). Its only remaining monuments, beside the proper names handed down to us by the classical writers, are the inscriptions of the Achæmenian princes, written in the characters called cuneiform or arrow-headed. These inscriptions are pretty fully treated of in the article CUNEIFORM INSCRIPTIONS, and specimens with translations of the inscribed texts have there been given; so that little need here be said in addition respecting their language, and that little will find its most appropriate place in connection with what we shall say of the next language, the Avestan, which is far more completely preserved and better understood. II. *The Avestan, or Old Bactrian.* This language is ordinarily known as the Zend, but the title is so unfortunate a misnomer that its use is altogether to be discountenanced and avoided. The name Zend (of disputed etymology) properly belongs, not to the language in which the Avesta is written, but to a translation of the Avesta into Huzvaresh or Pehlevi. The appellation Old Bactrian, which is favored by some of the later German scholars, as Spiegel and Haug, is open to two objections, viz.: that it contains a theory respecting the locality of the dialect, which, though highly probable, is not actually established as true; and that it seems to imply a modern Bactrian, not known to philologists. Avestan is the simplest and most characteristic title which can be given it, denoting it as the tongue in which is composed the Avesta. This work, the sacred scriptures of the religion of Zoroaster, formerly professed by all Iran, and still held by the Parsees of India, as well as by a few scattered communities of Guebres left behind in Persia, is its sole monument. The question of its age depends upon that of the period of Zoroaster himself, and of the history of the Zoroastrian scriptures, only a small portion of which, if any part, can be as ancient as the founder of the religion; and both these questions are as yet entirely undetermined, in spite of the many attempted solutions which they have received. (See ZEND-AVESTA, and ZOROASTER.) In the character of the language, as compared with its next neighbors and nearest congeners on either hand, the Achæmenian Persian and the Vedic Sanscrit, there is nothing which should lead us to any well grounded opinion as to its absolute period. In the scale of linguistic development, in remoteness of descent from the common ancestor, it occupies nearly the same place with the Achæmenian, while both are less primitive in their structure than the sacred and classical dialects of India; but such is the inequality of the rate at which different descendants of the same original tongue, under different conditions, are found to develop themselves and become corrupted and altered, that no definite conclusion can be drawn from the comparison. We can only say that the Avestan is an ancient Iranian dialect, doubtless older, and perhaps much older, than the Christian era. As regards its locality the case is more clear; the internal evidence of the Avesta is unequivocally in favor of placing it in the N. E. portion of Iran, in Bactria, on the head waters of the Oxus, or in neighboring provinces; and other testimony points to the same conclusion. It is the ancient Persian of the north-east, as the Achæmenian is of the south-west. The knowledge of this language was brought to Europe just a century ago, by Anquetil-Duperron, who went to India on purpose to recover the Zoroastrian scriptures and the means of their comprehension. Of its grammatical structure he obtained no valuable knowledge, and his translation of the texts was extremely inaccurate; his Parsee teachers, in the decay of traditional learning among them, having been able to give him but imperfect information from the translations and comments in their hands. The possession and study of these auxiliaries themselves, and more especially the comparison of the Avestan with the so nearly related Sanscrit, have enabled modern scholars to gain a far better understanding of this ancient idiom, and of the works composed in it. The Dane Rask (about 1826) was one of the first to lead the movement; it was continued by Bopp, in his "Comparative Grammar" (Berlin, 1833-'52), and more especially by Burnouf of Paris (1829-'52), who was for many years the chief representative of Avestan philology; Olshausen, Lassen, Roth, Benfey, Brockhaus, Holtzmann, and Haug have done much in the same cause; but the chief laborers in its behalf at present are Spiegel of Erlangen and Westergaard of Copenhagen, both of whom have begun to publish complete editions of all the monuments of the language, with translations and other needed helps to their comprehension. No grammar or dictionary of the Avestan has, however, as yet been made public, and the facilities for its study are very limited.—The Avestan is written in an alphabet which, unlike most of those of the Indo-European languages, reads from right to left. It came ultimately from a Semitic source, but is proximately an expanded form of that in which the Huzvaresh is written, and of an age considerably posterior to the Christian era; it has nothing whatever to do with any of the cuneiform modes of writing. How the Avesta was recorded prior to its transcription into this character we can only conjecture. It is a complete alphabet, retaining no trace of a syllabic character, but giving a separate sign for every analyzable sound, vocal or consonantal, and even, in a few cases, different signs for sounds between which it is not easy to establish a phonetic distinction. It has 13 characters for vowels, and 33 for consonants, as follows: vowels—*a*, *â*, *i*, *î*, *u*, *û*, *e*, *ê*, *ĕ*, *o*, *ô*, a nasal *a*, and a diphthongal *ão*; consonants—guttural, *k*, *kh*, *q*, *g*, *gh*, *ng*, *ñg*; palatal, *ch*, *j*; dental, *t*, *t* (almost solely final), *th*, *d*, *dh*, *n*, *ñ*; labial, *p*, *f*, *b*, *m*; semivowels, *y* (three characters, regarded as equivalent; two initial only), *r*, *v* (two equivalent characters; one initial only), *w*; sibilants, *ç*, *s*, *sh*, *z*, *zh*; aspiration, *h*. The words are written apart from one another, with a dot or point between them, and exhibit none of that interfusion of adjacent ending and beginning which is characteristic of Sanscrit euphony. The principal distinctions of this alphabet from the Sanscrit are: the absence of the lingual series (a special Indian development) and of the semivowel *l*, the addition of the intermediate vowels *e* and *o*, and of the sonant sibilants. The system of syllabic combinations of vowels, of diphthongs and triphthongs, is also very expanded and intricate; more so, it has been conjectured, than the language itself fairly warranted, involving an overstraining after the designation of vowel distinctions. Among the chief phonetic peculiarities of the language are: the general aspiration of a mute before a semivowel, nasal, or sibilant, as *jaghmushi* for *jagmushi*, *fra* for *pra*, *khshathra* for *kshatra*; the epenthesis of *i* when preceded by a dental, a labial, or *r*, especially the latter, as *airya* for *arya*, *paiti* for *pati*; also of *u* when preceded by *r*, as *aurvat* for *arvat*; and the conversion, as in Greek, of a primitive *s* into *h*, as *hapta* for *sapta*, Greek ἑπτα, Lat. *septem*; *haurva* for *sarva*, Greek ὁλος, Lat. *salvus*. The alphabet of the Achæmenian Persian differs from this less in phonetic character than in its scanty and imperfect provision for the representation of sounds; its vowel system, especially, is written with Semitic niggardliness; it has a partially syllabic character, possessing in certain cases different signs for a consonant according as it is followed by *a*, *i*, or *u*. It lacks all the sonant aspirates of the Avestan, and agrees with it in being destitute of an *l*. It has a special weakness in tolerating no final *t* or *n*, which has caused it the loss of many characteristic inflections. In general, it agrees in phonetic character with the Avestan where the latter differs from the Sanscrit. The grammatical forms of both the ancient Iranian dialects correspond very closely with those of the Sanscrit. It is only by the help of the latter language that a clear understanding of the Avestan grammar, and through it of the Achæmenian, could possibly have been attained. The scantiness of the materials, and the corruptions of the recorded texts, would have frustrated any attempt to construct the etymological part of the ancient Persian grammar from a study of the Persian monuments alone. An acquaintance with the Sanscrit is the first and indispensable requisite for one who would approach the investigation of the oldest Iranian dialects. In order to illustrate the close connection of the three idioms, and to show the prominent part which the Sanscrit has played in the interpretation of the other two, we give below a brief sentence from the Avesta (the *Abân Yesht*), with the corresponding Sanscrit below, and also the Achæmenian forms, so far as they are found to occur. Of course, the parallelism is not by any means everywhere so close; we have purposely selected a passage in which every word admitted of comparison; yet, if a favorable, it is also a truthful and telling exhibition of the exceedingly near accordance, both in grammar and in vocabulary, of the most ancient representatives of the Iranian and Indian branches of the Aryan form of speech:

Av. *daedi mê vanguhi çevisti . . . yatha azem upemem*
Sans. dehî me vasvî çavishthe yathâ aham uparam
Ach. *mîy yathâ adam*

Av. *khshathrem bavâni viçpanãm daqyunãm daêvanãm*
Sans. kshatram bhavâni viçvânâm dasyûnâm devânâm
Ach. *khshatram [bavâniy] visanâm dahyunâm*

Av. *mashyanam ca yâthwam. .*
Sans. martyânâm ca yâtûnâm.
Ach. *martiyanâm câ*

"Grant me, O excellent, most mighty one! that I may attain the chief authority over all countries, devs, mortals, and jotuns."

In the Avestan nouns, substantive and adjective, we find the 3 numbers of the Sanscrit, and its 8 cases (instrumental and locative, beside the 6 of the Latin); but in the texts the cases are not a little confounded together as regards their usage. The dual number, and some of the cases, are not to be traced in the Achæmenian dialect, probably owing to the scantiness of its monuments. The genders are 3, as in all the other early languages of the family. The whole apparatus of derivative suffixes and of forms of declension is nearly the same in both the Persian dialects as in the Indian, allowing for phonetic transmutations and some anomalies and irregularities. The same may be said, upon the whole, of the pronouns and numerals. The verbal roots are uniformly monosyllabic; but those of secondary or derived formation are notably more numerous than in Sanscrit. We find again, also, the 2 voices, active and middle, the 3 numbers, and the 3 persons of the Indian language. The tenses are 5: present, imperfect, aorist, perfect, and future. The first 2 exhibit special modifications of the root corresponding with the conjugational characteristics of the Sanscrit, but these modifications are more apt here than there to extend themselves irregularly to the other tenses also. The future is almost lost from use, and its place is supplied by the present subjunctive. The perfect and future have only an indicative mood; the other tenses possess, in more or less completeness, an optative, a subjunctive, and an imperative. Occasional instances of periphrastically formed tenses occur. Of derivative forms of the verb, we meet with passives, causatives, desideratives, and intensives, as also denominatives.

These explanations apply especially to the Avestan; the scantiness of the Achæmenian monuments is the cause that of the verbal structure their language exhibits only fragments. Yet what we have said of the eastern is doubtless true in all main particulars of the western dialect; the records make known no discordances between the two of sufficient account to be noticed here. A portion of the Avesta, the so called *Gâthâs*, or metrical ascriptions of praise, somewhat akin to the hymns of the Indian Veda, is composed in a dialect differing slightly from that of the rest of the work, and apparently of greater antiquity. So likewise some grammatical differences have been pointed out between the inscriptions of the earlier and those of the later Achæmenian princes.—The two dialects of which we have thus far treated form a sub-group, that of the ancient Iranian dialects; the remaining three also stand in a special relation to one another, as the modern Persian idioms. III. *The Huzvaresh.* This language is also called by the name of Pehlevi, which is to be discarded, as a term of doubtful etymology and meaning, and as variously and somewhat indefinitely applied by the Persians. It is represented by a complete version of the Avesta (to which belongs the name Zend), and by a few independent texts in addition, but all constituting a part of the Zoroastrian scriptures; chief among these additional texts is the *Bundehesh*, a cosmogonico-philosophical work. Some rather scanty and as yet but imperfectly deciphered inscriptions and legends on coins, memorials of the Sassanian kings of Persia, are also regarded as representing the same dialect, or a slightly different form of the same. Its fundamental character is that of a Persian idiom, occupying very nearly the same stage of development with the Parsee and the modern Persian, but especially and widely differing from them in admitting an almost unlimited intermixture of Semitic (Aramaic) words; these, however, like the Arabic introduced into the modern Persian, are fully subordinated to the Iranian element of the language, being Persianized in inflection and construction. It is as if, for Persian terms, of every part of speech, not excepting pronouns and particles, it were permitted to substitute at will synonymous Aramaic words. The aspect of the idiom is not so much that of an organic combination of two diverse tongues to produce a new language, like the English, as of an artificial or mechanical mixture, like some styles of the modern Persian. Such a mixture must apparently have been rather a conventional mode of composition than a true popular dialect, and it can have arisen only on the borders of the Semitic and Iranian territory, where the population of the two races was thoroughly intermingled, and each was familiar with the speech of the other. It is accordingly located by Spiegel, whose labors upon it are the chief medium by which it is known to the world (see especially his *Grammatik der Huzvaresch-Sprache*, Vienna, 1856), in the border lands along the Tigris, and is referred to the 5th century after Christ, and later. It has a peculiar alphabet, and one of extreme difficulty, owing especially to the defective distinction of its signs; thus, *v*, *o*, and *n* are written with precisely the same character; also *a* and *kh*; also *i*, *y*, *g*, *j*, and *d*; these last, however, being in some MSS. distinguished from one another by diacritical points. There are also numerous compound letters, digraphs and trigraphs, of a not less ambiguous and perplexing character. This alphabet, and the necessarily resulting uncertainty of reading of almost every word written with it, is the most formidable difficulty in the way of a comprehension of the language. It is of Semitic origin, reads from right to left, and, so far as it goes, is mainly coincident with the Avestan alphabet; which, as already noticed, is looked upon as an expanded and completed form of it, or of its proximate original. As both the Huzvaresh and the Parsee closely accord with the modern Persian, being but slightly more antique dialects of it, and as a main part of their linguistic value lies in the light which they cast upon the history of the Persian, we shall, in order to greater clearness as well as to economy of space, speak of their phonetic and grammatical form in connection with our description of that of the modern dialect. IV. *The Parsee.* The name Parsee is applied, for convenience' sake, to a pure Iranian dialect, slightly more modern in its forms than the Huzvaresh, and approximating nearly to the Persian, from which it is distinguished by its retention of a few ancient forms of inflection, and many ancient words and phrases, which the later idiom has lost. The scanty literature which represents it belongs to the body of Zoroastrian scripture, and is believed to be composed wholly of translations from Huzvaresh originals. Its almost entire freedom from Semitic elements shows it to belong rather to some central or eastern portion of the Iranian territory than to the west; its period is supposed to be that of the later Sassanian monarchs and the early times of Moslem supremacy. It is written sometimes in the character of the Avesta, and sometimes in the Arabic alphabet, as adopted by the modern Persian. The chief source of our knowledge of it is Spiegel's grammar (*Parsi-Grammatik nebst Sprachproben*, Leipsic, 1851). V. *The Modern Persian.* By this we mean the language which has been during 900 years past the cultivated language of Persia. In distinction from the popular dialects of the country, it is called *Deri*, "court language." How far it differs from them we are not sufficiently informed, nor have we satisfactory knowledge respecting the condition of the idioms of the various parts of the country. According to native authorities, each considerable province has a dialect of its own, and that which is spoken in and about Shiraz and Ispahan approximates most nearly to the cultivated tongue. Persian is still spoken, not only throughout the present kingdom of Persia, but all over the Iranian territory, and even beyond its borders; but its prevalence is different in different regions. About the Caspian it is in great measure crowded out by the dialects of the almost exclusively Turkish population. Throughout a great part of Khorassan the Persian is the language of the cities, while the nomadic tribes who occupy the surrounding wastes are of Tartar descent and idiom. In other parts this relation is in a manner reversed; thus, in Afghanistan and Beloochistan the ruling race is of another, though ultimately kindred lineage, while the mass of the agricultural population is made up of Persian-speaking Tajiks. Nearly the same is the case in the southern portions of Toorkistan or Independent Tartary, an ancient seat, as we have seen above, of Iranian religion and civilization; and the Iranian population even extends beyond the Bolor Tagh into some of the provinces of Chinese Tartary. Conquests, commerce, and culture have combined to carry the Persian language beyond its ancient limits; the subjugation of India by Persian monarchs introduced it as the court language of Delhi, and made Hindostan long a centre of Persian literary culture; it is but recently that Persian has ceased to be the recognized official language of British India. The Turks have carried it, in a certain way, as far in the opposite direction; the cultivated Osmanli is full of Persian words and phrases, and its literature is in great part founded upon Persian models.—The appearance of the modern Persian language, and the rise of its literature, are contemporaneous with the disintegration of the caliphate of Bagdad, and the resurrection of Persian nationality under native and virtually independent sovereigns in the 10th century. During the 3 centuries that Persia had lain under the heel of its Mohammedan conquerors, its national independence destroyed, its religion and social institutions swept away, it had exercised in virtue of its superior culture a powerful influence upon its oppressors, and its scholars had borne a prominent part in starting into life the Moslem literature, philosophy, and science; but not until after the lapse of that interval did there take place a revivification of elements distinctly Persian. With the latter part of the 10th century, then, begins the career of the modern Persian, of which we shall now proceed to give a concise description. The Persian is hardly to be considered as the direct lineal descendant of either of the two ancient dialects, the Achæmenian or the Avestan, but it is more nearly related to the former than to the latter, as is shown by such evidences as the infinitive ending *ten*, Ach. *tanaiy*, Av. *teê*; *dest*, hand, Ach. *dasta*, Av. *zasta*, &c. As already remarked, it is closely connected with the Parsee, and with the Iranian portion of the Huzvaresh, being but a slightly modernized form of the same tongue. As an analytical language, exhibiting an almost complete breaking down and abandonment of the ancient system of forms and inflections, and the substitution of independent form-words and connectives, it stands quite upon a level with the English; its grammar, in striking contrast with the complexity of that of the two ancient dialects, is of the baldest simplicity. It is always written with the Arabic alphabet, to which, however, it has added 4 signs, to express the sounds *p*, *ch*, *zh*, and *g*; on the other hand, 8 or 9 of the Arabic characters are useless to it, occurring, save in very rare cases, only in Arabic words, and being pronounced, like other letters in the alphabet, without the distinctive Arabic utterance. The spoken alphabet is nearly as follows: vowels, *a*, *e*, *i*, *o*, *u* (as to the vowel pronunciation, even of the cultivated dialect, there appears to exist much diversity in different regions; the vowels are written, of course, in the very imperfect Semitic fashion, sharing among them only 3 characters, and generally omitted when short); consonants—guttural, *k*, *kh*, *q*, *g*, *gh*; palatal, *ch*, *j*; dental, *t*, *d*, *n*; labial, *p*, *f*, *b*, *m*; semivowels, *y*, *r*, *l*, *v*; sibilants, *s*, *sh*, *z*, *zh*; aspiration, *h*. The Parsee alphabet is almost precisely the same with this, nor does that of the Huzvaresh present any difference worthy of notice. All show a near relationship with the systems of sounds of the ancient dialects, differing from them chiefly by the loss of certain aspirates (the dental), and by the possession of an *l*.—In treating of declension, we have first to note the fact that the Persian, like the English, has lost all suffixes and terminations distinguishing gender, and that it accordingly agrees with our language in possessing no artificial or grammatical gender. It is yet poorer than the English in lacking the distinction of gender in the pronoun; it cannot even say "he, she, it;" where a distinction has to be made between masculine and feminine, it employs separate words meaning male and female. The same is the case in the Parsee and Huzvaresh. There are two endings for the plural, *ân* and *hâ*, the former a relic of the ancient genitive plural (*asp-ân*, horses, Av. *açpanâm*, of horses), the latter of the dative and ablative (*asp-hâ*, Av. *açpaêibyaç*, to or from horses; a few Parsee words have the fuller form *hyâ*); *ân* is now regularly restricted to animate objects, but in the Parsee is applied to both animate and inanimate, and in the Huzvaresh is the only plural termination. The syllable *râ* is used as a sign of the accusative (*asp-râ*); it is originally an independent word, meaning way, and in the two elder dialects is not an accusative termination, but adds to the noun the idea, "by way of, by reason of;" if an adjective follows the noun, the syllable is appended to it instead of to the noun (*asp-i-bad-râ*, the bad horse). Between a genitive and the noun which governs it is inserted the so called *izâfet*, or the vowel *i*, as *asp-i-merd*, the horse of the man; the same is also interposed between the substantive and the adjective which agrees with it, as *asp-i-murdeh*, dead horse. The beginning of this usage is to be traced even in the Avestan; the inserted syllable is a relic of the relative pronoun *ya*, which has come to assume the office of indicating alone a relation originally expressed also by the termination of the following word. Thus, the former expression would have been in Avestan *aspo yo mashyâhê*, the horse which (is that) of the man; the latter, *aspo yo mereto*, the horse which (is) dead. In the Parsee and Huzvaresh, this *i* also stands in other connections, as an ordinary relative pronoun. Some philologists, without sufficient reason, have chosen to see in the use of the *izâfet* an imitation of the construct state of the Semitic noun, and as a proof of Semitic influence. Singularity or individuality is indicated by an appended *î*, as *asp-î*, a single horse; this *î* is a remnant of the older *aêva*, one, and by the two next earlier idioms is used also as an independent numeral. The language possesses neither definite nor indefinite article. The suffixes of comparison of adjectives are *ter* for the comparative, *terîn* for the superlative; the latter is a peculiar Persian development; the two older dialects have *tum*, corresponding to Av. *tema* (Sans. *tama*, Lat. *timus*). The Persian and Parsee pronouns are pure Iranian, modern representatives throughout of those presented by the ancient dialects; the Huzvaresh employs as often, or yet oftener, Semitic forms. The three later idioms have a complete set of suffix pronouns, which are, for the three persons, singular *em*, *et*, *esh*, plural *emân*, *etân*, *eshân*; in the Persian they are attached especially to nouns and verbs, to express the genitive, dative, or accusative relation, as *asp-em*, my horse, *guftem-esh*, I spoke to him; in the older idioms they are appended only to conjunctions, prepositions, and other pronouns as *az-et*, from thee. They are a perfectly organic growth of the Iranian language, and are not to be attributed, any more than the *izâfet*, to Semitic influence.—The Persian verb has preserved hardly more of its original structure than the noun. It has indeed a complete and invariable set of personal endings, viz.: *em*, *î*, *ed*, *îm*, *îd*, *end*; but its tenses are mostly formed periphrastically. The infinitive ends in *ten* or *den* (Parsee usually, Huzvaresh always, *tan*), which corresponds to the Achæmenian *tanaiy*; the past participle in *teh* or *deh* (Ach., Av., and Sans. *ta*). From this participle is formed a preterite, by striking off the *eh*, and appending the forms of the present tense of the auxiliary to be, which, except in the third person, *est*, agree precisely with the personal ending just given; thus, from *kerden*, to do, part. *kerdeh*, pret. *kerdem*. This becomes an imperfect by prefixing *mî* or *hemî*, which in Parsee and Huzvaresh is an independent word, meaning always, continually. From the unabbreviated participle, with the present and preterite of the same auxiliary, come a perfect and pluperfect, *kerdeh em* and *kerdeh bûdem*. A future is formed by prefixing to the apocopated infinitive the present of the verb to will, to wish, *khâhem kerd*. The imperative of this verb is *kun*; the irregular verbs, which are numerous, and as usual the oldest and the most used of all, present always a discordance between the forms of the root as they appear in the infinitive and imperative respectively, and in this consists their irregularity; these two forms being given, the rest of the verb follows as a matter of course. Sometimes the one, sometimes the other, shows the root in a purer and more original form; in *kun* we have it as affected by the conjugational peculiarity of the ancient present and imperfect; compare Ach. *a-kun-avam* (imp.), Av. *keren-aomi*, Sans. *kru-omi*. By adding to the imperative the personal endings, we obtain the only original and simple tense of the Persian verb, corresponding to the ancient present and imperfect, and having the value of both present and aorist; it is made distinctively the former by prefixing *mî* or *hemî*, already spoken of. Of the ancient subjunctive we have a single trace, in an optative 3d person singular: *kunâd*, may he do! The passive is formed by the auxiliary *shuden*, meaning originally to go.—The facility of composition in the Persian is very great; epithets formed of a noun and a verbal, of an adjective and a noun, and of two nouns, are of the most frequent occurrence. A very characteristic feature of Persian style, too, is the formation of a compound or derivative verb by combining an adjective or noun with some one of a large class of half auxiliaries, of which the most frequent are to do, to make, to bring, to have, to show, to come, to become, to take, and to find. It is partly by the favoring influence of such processes of composition that the Persian has become in later times so impregnated with Arabic. The earliest Persian writers, as Firdusi and the translator of Tabary's Arabic history, wrote in a nearly pure Iranian dialect, with no greater infusion of Arabic words than was natural and unavoidable, considering the position and influence in Iran of the Arab religion and culture. But a less legitimate mixture soon began to prevail; every highly cultivated Persian was as familiar with Arabic as with his own mother tongue, and a depraved and servile taste introduced the practice of drawing upon the Arabic lexicon not only to fill out felt deficiencies of the Persian vocabulary, but, from affectation and pedantry, to such an extent as to half convert the language into Arabic. Often the merest necessary cement of a sentence or paragraph is Persian, all the materials of which it is composed being Arabic; and occasionally such a monstrosity is met with as a sentence or phrase which is pure Arabic, even to its construction. Hence, no one can now make himself a thorough Persian scholar, or gain a familiarity with the Persian literature, who has not first mastered the Arabic. In the present low condition of Persian nationality, any reaction against this abuse is hardly to be looked for; it is the rankest injustice on the part of the Persian toward his mother tongue, which is one of the most copious and flexible, the most sonorous and musical, the most cultivable, highly cultivated, and elegant of modern languages. It may not be useless to add here that the theory of a specially intimate connection between the Persian and the Teutonic (German) languages, and so between the races also who speak them (a theory at one time much in vogue, and counting some famous names among its supporters), is only the dream of a crude and childish philology, and is entirely destitute of real foundation.—LITERATURE. The scanty literatures of the three earlier Persian dialects, the Avestan, the Huzvaresh, and the Parsee, being comprised within the limits of a single work, or connected body of writings, which together make up the sacred scriptures of the modern Parsees, will be best considered together in the article ZENDAVESTA. We shall accordingly speak here only of the modern Persian literature. The date and mode of the origin of this literature have already been briefly stated above, in speaking of the language in which it is composed. A national feeling, and an active literary spirit, must have been already for some time stirring among the masses of the Persian population, to lead to so immediate and hearty a recognition of the claims of song on the part of all the upstart dynasties of eastern Iran, which succeeded one another so rapidly during the 9th and 10th centuries. Each court had its bards, whose panegyrics, and the admiration of whose powers, shed lustre upon the throne. Royal patronage has borne an important part in the whole history of Persian literature; one of its chief branches is panegyric, and few of its great names were not attached to the personal suite, or recipients of the special bounty, of some monarch. Even the wild Tartar tribes which burst one after another into Iran, and subjugated it to their sway, were at once softened and charmed by the strains of Persian song, and their barbarian dynasties became, without exception, its lovers and protectors. Had not the feeling been genuine, the genius strong, the national appreciation universal and hearty, such patronage must soon have corrupted the rising literature, converting it into mere servile adulation. Of servility and adulation there was indeed enough; but along with it a true, healthy, growing, and productive literary life, during more than 5 centuries. We can give here, of course, but an outline sketch of its development, and can mention only the most prominent and highly considered of the hundreds of authors of note, whose works or whose reputation have come down to later times. Although names and fragments of poetry of an earlier date have escaped oblivion, it is under Mahmoud of Ghuznee, the first Moslem conqueror of India, and on the extreme eastern verge of Iran, that the national literature was fairly launched on its new career. Under this prince, and at his bidding, Firdusi sang his immortal epic, the *Shah Nameh*. This earliest of the Persian poets remains unexcelled in genius and dignity by any of his successors. His work summed up the whole mass of native traditions respecting the national history; it is a true national epic, a final relation, accepted by a whole people, of its own popular legends. No other Persian poem enjoys the wide repute of this; none other has the same high interest to us of the West. Of epic-romantic poets, the most famous is Nizami, who died 80 years after Firdusi, in 1200. His "Quinquiad," or collection of his 5 best romances, became the model of many a like collection in later times. From among the innumerable crowd of those who have distinguished themselves especially by their panegyrical writings, we need mention but two: Enveri, the acknowledged prince of panegyrists, who died at Balkh in 1152, and Khakani, who lived a generation later. Both are remarkable for learning, as well as for fertility of fancy and elegance of style. An important branch of Persian literature, and one which began to develop itself very early, is that which represents the doctrines of the Soofees, or religious mystics. Doubtless we are to recognize a certain resistance on the part of the Persians to the slavery into which they were forced to Arab faith and doctrine, in their general adoption, on the one hand, of the unorthodox and detested tenets of the Sheeahs, who accept the Koran and Mohammed, but deny the right of the first three caliphs; and, on the other hand, in the prevalence of mysticism among them. Persia, if not the home of Soofeeism, as has been both maintained and denied, is at least the ground where it has most fully developed itself, and held longest and most exclusive sway. The oldest Soofee poet of great celebrity is Zenayi, who died in 1180; his works were superseded by the yet more highly esteemed productions of Ferid-ed-din Attar, who, born in 1216, lived more than 100 years, and was slain at last in the Mongol storm and sack of the city where he dwelt. His works are unintelligible in their interior meaning without special commentaries. Among them, the most esteemed are the "Book of Counsel" (*Pend Nameh*), "Language of the Birds" (*Mantik-uttair*), and "Essences of Substance" (*Jevahir Nameh*); the two former have been published and translated in Europe. Even Attar was excelled, however, by his younger contemporary Jelal-ed-din Rumi (died 1262), the founder of the most widely extended order of Moslem monks, the Mevlevi, and author of the *Mesnevi*, the chief oracle of Soofeeism, and, next to the *Shah Nameh*, the most generally known and highly esteemed (in the Orient) of all the productions of oriental literature; its profundity, its sublimity, and its inspired wisdom are regarded as unapproached and unapproachable. It could not fairly be expected, however, that the less imaginative and more practical occidental taste should appreciate and delight in these bursts of the transcendental enthusiasm of the Orient. A poet more to our mind, and who has done more than any other for the fame of Persian poetry in the West, is Saadi. He belongs to the same period with the authors last named, having died in 1291, at the advanced age of 102 years. He is said to have spent the second 30 years of his life in travelling, and the third in meditating upon and digesting his acquisitions and experiences, and only the last 12 years in the actual composition of his immortal works. If sceptical as to the literal truth of this systematic division of his life, we need not question that he travelled and saw much, and wrote his most esteemed productions at an advanced age. We know that he lay for some time in Christian captivity, taken prisoner in battle with the crusaders. In both these circumstances has been sought an explanation of the cooler fancy, the purer taste, the more practical morality, which distinguished Saadi among oriental authors. He is most eminent as a moral and didactic poet; his two best works, the "Fruit Garden" (*Bostan*) and "Flower Garden" (*Gulistan*), are collections of brief tales and apologues, interspersed with aphorisms and lessons of morality, in prose and verse; both have been translated into nearly all the languages of Europe. By his countrymen Saadi is equally esteemed as a lyric poet. But the greatest of Persian lyrists is Hafiz, of Shiraz, who lived a century later (he died in 1391); in him Persian poetry is regarded as having attained its very highest flight. Though a dervish, deriving his name (Hafiz, retainer) from his knowing by heart the whole Koran, and though living always in contempt of wealth and splendor, he was a thorough free-thinker and indifferentist in matters of religion, and his inspiration is solely that of the most enthusiastic and intoxicated sensual enjoyment; the unvarying themes of his song are love and wine, the rose and the nightingale. A mystical explanation has been given to the outbursts of his passion, and the same poems which are sung as erotic and drinking odes by the young debauchee, are pored over by the aged devotee as containing the essence of holy ecstasy; but the interpretation is forced and false, and mainly a device to save the pride of Persian literature from condemnation as an infidel and sensualist. Persian poetry has but one other great name to boast after Hafiz; it is that of Jami, who lived a century later, dying in 1492, at an advanced age. He is a poet of the most varied genius, and, though not accounted as the very first in any department, he is exceeded only by the very first in each; thus, in panegyric he is esteemed as second only to Enveri, in romance to Nizami, in mystic poetry to Jelal-ed-din, in moral and didactic to Saadi, in lyric to Hafiz; these 5, with Firdusi and himself, being admired as the 7 most brilliant stars in the firmament of Persian poetry. The fame of Jami stands highest, perhaps, as a romantic poet, though prose works of high merit have also come from his pen, including a history of the Soofees, and a collection of letters as models of epistolary style, a branch of elegant literature much cultivated by the Persians in later times, and in which Jami is unexcelled. With the 15th century closes the proper history of Persian poetry; since that time, although much increased in extent, it has grown little in value.—We have hitherto spoken only of the poetry of Persia, because that is by far the most important and valuable department of the national literature. Next to it in consequence is the department of history. For the older traditional history of Persia itself, Firdusi has continued the chief and almost sole authority; later writers have added little to what is recorded in the *Shah Nameh*. But a host of later historians, beginning from rather a recent period, about the middle of the 13th century, have treated of the later Persian history, especially of that of Genghis Khan and his descendants and successors, and of the remarkable overturnings of Asiatic power of which Iran has been a principal scene; and their works are important sources of the world's knowledge respecting the events of the period. Among the chief names here are Reshid-ed-din (born 1247), Wassaf (of the same epoch), whose elaborate and excessively ornate style makes him one of the most difficult of Persian authors, and Sheref-ed-din, the historian of Tamerlane. Of later authors, Mirkhond (died 1497), a writer of universal history, and his son Khondemir, are most distinguished. An important branch of Persian history, too, has India for its native place and its theme. In entertaining or amusing literature, such as fables, tales, anecdotes, legendary and supernatural stories, and the like, Persia is very rich, and it is supposed to be the source whence much of the European literature of this class, dating from the middle ages, was derived. In Moslem theology and jurisprudence, as was to be expected, the Persians are chiefly dependent upon Arabic authorities, and have produced no literature requiring mention here. In philosophy and the exact sciences nearly the same is the case, yet rather in appearance than in reality, and because the Persian savants have chosen to write in the Arabic language rather than in their own; a large proportion of the most highly considered scientific works in the Arabic literature are by Persian authors.—Helps for the study of Persian abound in England. The best grammars are those of Sir William Jones, by Wilkins (1809), Lumsden (2 vols. fol., Calcutta, 1810), Prof. Lee (1828), and Duncan Forbes (1844). The most remarkable monument of Persian lexicography is *Haft Kulzum*, "The Seven Seas," a dictionary in 7 vols. fol., by the king of Oude (printed at the royal press, Lucknow, 1822); and the most useful, Richardson's "Persian, Arabic, and English Dictionary," by Wilkins and Johnson (4to., 1829).

PERSIAN GULF, an arm of the Indian ocean which lies between Persia and Arabia, extending from lat. 24° to 30° N., and from long. 48° to 57° E.; extreme length 600 m., breadth from 40 to 200 m.; area estimated at 80,000 sq. m. Its entrance from the Indian ocean is through the Arabian sea, the gulf of Oman, and the strait of Ormuz, the last of which is about 35 m. wide. The shores are much indented along both coasts; but the only harbors of importance are Bushire on the Persian side, and Bassorah near the N. end, on the westernmost mouth of the Shat-el-Arab, the river formed by the junction of the Tigris and Euphrates. The coasts of the gulf are low, except near the entrance, where the mountains on both sides rise to a considerable height and come close to the sea. On the S. or Arabian side there are numerous shoals and reefs, which render the coast exceedingly difficult of approach in large vessels. There are several islands in the neighborhood of the Arabian shore and the strait of Ormuz, the most important of which are Kishen, Ormuz, and Aval or Bahrein islands. The only river of any considerable size that falls into the gulf is the Shat-el-Arab. At the straits of Ormuz the tide rises 12 feet, and about the N. end of the gulf 6 feet. There are pearl fisheries in the neighborhood of the W. and S. shores, the value of which is estimated at $1,500,000 per annum.—The whole of the shores of the Persian gulf are inhabited almost exclusively by Arabs. For many years the gulf was infested by pirates, who when pursued found safety among the shoals and islands on the coast of Arabia. In 1809, and again in 1819, the British sent expeditions against them from Bombay, which, in conjunction with the imam of Muscat's forces, completely destroyed their vessels, and they have been since held in subjection by the constant presence of cruisers. The Persian gulf is the ancient sea of Babylon, and the earliest profane record which we have of its navigation is that of the voyage of Nearchus in 325 B. C.

PERSIGNY, Jean Gilbert Victor, count de, a French statesman, born at St. Martin d'Estréaux, department of the Loire, Jan. 11, 1808. His family being in reduced circumstances, he enlisted in the army as a private when 17 years old, was afterward admitted to the military school of Saumur, and rejoined the army as a non-commissioned officer of hussars. After the revolution of 1830, being suspected of entertaining seditious designs, he was dismissed. He became a contributor to the newspaper *Le temps*, and a faithful adherent of the Saint Simonian doctrines, so much so that in 1832 he followed Father Enfantin to Menil-Montant. He visited La Vendée at the time when the duchess of Berry was concealed there; returned to Paris to assist in the making up of a legitimist correspondence, to be furnished to the provincial newspapers; and now assumed the title of viscount de Persigny. Convinced that there was no hope of a restoration of the Bourbons, he became a Bonapartist in 1834. A paper of his, *L'Occident Français*, attracted the attention of the Bonaparte family, and he visited Arenenberg, with a letter of introduction to Louis Napoleon, who was then styled Prince Louis. A close intimacy between the two young men was the consequence of this visit; and Persigny at once set to work to organize the Bonapartist party. The result of his exertions was the attempt upon Strasbourg in 1836. More fortunate than his companions, he escaped and repaired to England, where he published an apologetic account of the expedition, *Relation de l'entreprise du prince Napoléon Louis* (London, 1837), which was reprinted in New York. In July, 1840, he participated in the landing at Boulogne, and was taken prisoner, arraigned before the court of peers, and sentenced to 20 years' imprisonment. From Doullens, where he was first incarcerated, he was allowed to remove on account of ill health to Versailles, where he enjoyed comparative liberty. Here he wrote an essay entitled *L'utilité des pyramides d'Égypte* (1844), which he presented to the academy of sciences, and in which he asserts that those gigantic constructions were merely built to protect the valley of the Nile against the encroachments of the sand of the desert. On the revolution of 1848 he returned to active life, and exerted himself to secure the election of Louis Napoleon to the presidency. On the latter's accession to power Persigny was chosen his aide-de-camp, and appointed to a high rank in the staff of the national guard. In 1849, being elected by the departments of the Nord and Loire to the legislative assembly, he sat for the latter, and proved an uncompromising supporter of the presidential policy. He was meanwhile sent on a temporary mission to Berlin. On the *coup d'état* of Dec. 2, 1851, in the preparation of which he was concerned, he appeared at the head of the 42d regiment of the line and took possession of the hall of the assembly, and was appointed a member of the consultative committee. As a reward for his services, he received, May 27, 1852, the hand of Eglé Napoléone Albine, the granddaughter of Marshal Ney, the title of count, and a gratuity of 500,000 francs. In Jan. 1852, he was appointed minister of the interior in place of M. de Morny, who had refused to sign the decree confiscating the Orleans property; he continued to hold this office until April, 1854, when he resigned on account of ill health. The following year he was appointed ambassador to England; he resigned in April, 1858, was reappointed in May, 1859, and still holds the office. In 1857 he was promoted to the rank of grand cross of the legion of honor, of which he had been created a chevalier in 1849.

PERSIMMON. See Date Plum.

PERSIUS FLACCUS, Aulus, a Roman satirical poet, born in Volaterræ, Etruria, Dec. 4, A. D. 34, died Nov. 24, 62. He belonged to the equestrian order, and after receiving the rudiments of a good education from his mother, for whom he always showed the strongest affection, went to Rome and studied with Lucan under the stoic philosopher Annæus Cornutus. Little more is known of his life, but he was distinguished for his blameless morals and amiable character. His extant works consist of 6 satires, which comprise in all no more than 650 hexameters, and there is no proof that he ever wrote more. His style is obscure, and abounds in colloquialisms, far-fetched metaphors, and abrupt transitions. Quintilian, Martial, and some of the early Christian writers speak in high terms of his merits, while others consider him not worth reading. The best editions of Persius are those of Jahn (Leipsic, 1843) and Heinrich (Leipsic, 1844). English translations have been made by Holyday, Dryden, Brewster, Sir William Drummond, and Gifford. The last has been published, together with a literal prose version by the Rev. L. Evans, in Bohn's "Classical Library."

PERSON, a N. co. of N. C., bordering on Va., and drained by branches of the Dan and the head waters of the Neuse river; area about 400 sq. m.; pop. in 1860, 11,221, of whom 6,195 were slaves. It has a diversified surface and a generally fertile soil. The productions in 1850 were 289,072 bushels of Indian corn, 49,802 of wheat, 1,562,119 lbs. of tobacco, and 18 bales of cotton. There were 6 grist mills, 4 tobacco manufactories, 2 tanneries, 18 churches, and 809 pupils attending public schools. Capital, Roxborough.

PERSONAL EQUATION, a term applied by astronomers to an error to which every observer is liable in marking the precise instant of a star's transit. Some observers anticipate the instant of contact, and some are behindhand in recording it; and curiously enough, the error is constant in kind; that is to say, one observer will give the time too early and another too late, not occasionally, but always. It is constant in quantity also, and accordingly the personal error of an observer is commonly given in decimals, and must be allowed for in all delicate calculations. It is not a fault of inexperience, but an imperfection common to the greatest observers, and seems to be positive or negative according as the temperament inclines to the sanguine or to the phlegmatic. It is by no means an insignificant source of error. In 1823 Bessel and Struve made a difference of an entire second in their respective records of an observation.

PERSPECTIVE, the art of representing on a plane surface objects as they appear to the eye from any determinate point of view. All the points of the surface of a body are visible by means of luminous rays proceeding from these points to the eye. If we suppose a vertical plane to be interposed between the object and the eye, and the intersection of these rays to be properly designated upon the plane, there would be marked upon it an image of the object, or perspective of it as seen by the eye. As we look out of a window, the glass may be considered the intersecting plane; and if we could draw or paint upon the glass the objects visible through it, the painting would be a true perspective. But only one eye must be used, as each eye, having its own view, sees the objects in a different place on the plane of the glass. This may be readily understood by closing the eyes alternately, and observing near objects, or in the contemplation of the views in a stereoscope, which appear as one. A different view opens to the eye at every change of position; the eye must therefore be kept still, which may be effected by a fixed sight or aperture through which the eye is directed during the sketching. As glass is inconvenient both to draw on and to preserve, it may afford an intelligible plane, but not a practical one for the purposes of sketching; this may be obtained through the means of finely perforated paper in which several apertures are contained within an area equal to the pupil of the eye, so that every part of each object is seen by some part of the eye, while other parts have a full view of the paper on which the objects are to be drawn; the view is thus transmitted through the paper with sufficient distinctness to enable the draughtsman to trace an outline on the inner surface of the paper. The paper must be placed vertically. The paper or plane on which the drawing is made is called the plane of the picture, the position of the eye the point of sight, and an imaginary horizontal line at the level of the eye the horizon. Toward some points in this line all straight lines not parallel with the plane of the picture converge; these points are called vanishing points. A picture, to be seen in true perspective, should be observed at the same distance from the plane of the picture and the same position of the eye under which it was drawn; but custom enables us to disregard these requirements, and appreciate a true picture even when looking with both eyes and from varied points. The perspective of objects being obtained by the intersection of the rays which emanate from them to the eye, with a vertical plane between the eye and the objects, the science may be resolved geometrically into the problem of constructing the section by a plane surface of a cone of rays of which the summit and base are given, the eye being the summit, the whole visible extent of the object or objects to be represented being the base, and the intersecting surface the plane of the picture. The resolution of this problem is the science of linear perspective. The faces of objects parallel with the plane of the picture are said to be in parallel perspective; faces oblique to this plane, in angular or oblique perspective. In the contemplation of a landscape, we observe that the objects nearest us are most distinct in outline and color; as they recede from the view the forms become vague and shadowy, and the colors lose their intensity and blend together. In painting a picture, therefore, to harmonize with nature, it must not only be drawn in true perspective, but it must also be colored in reference to the proximity of the objects to the spectator. This is termed the art of aërial perspective, since the softening of effect is due to the interposition of the medium through which the objects are seen, *i. e.*, the air.—To give a sort of perspective effect to the drawing of an object and yet enable it to be measured by a scale, to make a picture and yet have it adapted for mechanical construction, a projection has been devised, called isometrical perspective. The principle of this consists in selecting for the plane of the projection one equally inclined to 3 principal axes at right angles to each other, so that all straight lines coincident or parallel to these axes are drawn on the same scale; thus the projection of a cube would be in outline a regular hexagon divided into 3 equal rhombuses representing the adjacent faces. Isometry is especially applicable to mechanical and architectural drawings, as embracing in one view, and with sufficient naturalness, planes and elevations.

PERSPIRATION, the excrementitious aqueous fluid secreted by the sudoriparous glands of the skin, and also the product of simple physical transudation mixed with it. These glands consist of long convoluted tubes in the fatty tissue beneath the skin; the minute tubes unite to form a single duct, which passes up through the skin in a spiral manner, opening on the surface of the epidermis obliquely, so that its outer layer makes a kind of valvular covering. (See Diaphoretics.) There is a constant and generally insensible separation of fluid in the form of vapor by these glands; but when it is increased beyond evaporation by exercise, heat, or disease, it forms minute drops on the skin, commonly known as perspiration and sweat. It is usually acid from the presence of acetic or lactic acid, whence the sour smell observed in many disordered states of the system; the proportions of solid matters vary from 4 to 12 in 1,000 parts, these consisting principally of a proteine compound in a state of incipient decomposition (and in diseased conditions urea), with chlorides of potassium and sodium, and other saline compounds. In the perspiration from external heat, or from other causes of special determination of the blood to the skin, the product of transudation is increased, but the amount of solid matter is not augmented; the profuse perspiration after exercise in warm weather is not the cause of the fatigue experienced, but rather the diminished activity of respiration from the less amount of carbonic acid exhaled from the lungs at high temperatures; the colliquative sweats of phthisis and other exhausting diseases are the consequences rather than the causes of the general debility of the system. The amount of insensible cutaneous perspiration lost in 24 hours is from 1 to 3⅛ lbs., that of the lungs being from ⅜ to 1⅜ lbs. in the same time; this varies according to the external temperature and condition of the body; a hot and dry air, causing a greater determination of blood to the skin, produces a more active transudation, which passes off as insensible vapor, but in a moist atmosphere appears as sensible perspiration or sweat; it is also influenced by the state of the system and the quantity of fluid taken into the stomach. The vicarious offices of the perspiration and urine are noticed under Kidney; these are performed not only in regard to the amount of fluid eliminated, but also to that of the products of the waste of the system. It has been estimated that at least 100 grains of nitrogenized matters are daily excreted by the skin, and whatever interferes with this process tends to disorder the functions of the kidneys. Depressing emotions, especially fear, increase the perspiration, and great nervous excitement diminishes it; the destruction of the skin by an extensive burn, and the consequent suppression of the perspiration, produces death by congestion of the lungs; a varnish applied to the skin of a frog stops the transpiration, and causes death by "cutaneous asphyxia," the blood being imperfectly arterialized and the temperature much depressed. The fluid of simple transudation by its constant evaporation keeps down the heat of the body, the process being active according to the warmth and dryness of the air; the internal heat, however, is principally regulated by the secretion of the cutaneous glands, its evaporation carrying off a large quantity of free caloric which would otherwise raise the body's temperature; simple dry heat increases the secretion and evaporation, but heat and moisture combined check evaporation. Any sudden diminution of an active perspiration by exposure to cold disturbs the circulation, and brings on a variety of diseased conditions, for the treatment of which see Diaphoretics.

PERTH, a W. co. of Canada West, drained by the sources of Thames river; area, 698 sq. m.; pop. in 1851, 15,545. It is intersected by the Toronto and Goderich railway. Capital, Stratford.

PERTH, a city of Scotland, capital of Perthshire, picturesquely situated on the river Tay, here crossed by an elegant bridge, 45 m. by railway N. by W. from Edinburgh; pop. in 1851, 22,232. It is one of the most ancient cities in the kingdom, and was once surrounded by walls. It is connected by railways with the rest of the kingdom, and has some manufactures of cotton goods, &c. In 1851 the registered tonnage of the port amounted to 68 vessels of 5,535 tons. Perth is supposed to be of Roman origin, was at one time the capital of Scotland, and has been the scene of some remarkable events in the history of that country. It was captured by Edward I. in 1298, by Montrose in 1644, and by Cromwell in 1651. It was occupied by Dundee in 1689, and by the highlanders in 1715 and 1745.

PERTHES, Christoph Friedrich, a German book publisher, born in Rudolstadt, April 21, 1772, died in Friedrichroda, near Gotha, May 18, 1843. When 12 years of age he entered the gymnasium at Rudolstadt, and in 1787 was engaged in the bookselling establishment of Böhme at Leipsic. While serving his apprenticeship he fell sick, and was obliged to remain in his room 9 weeks, during which time Frederika, the daughter of his master, read to him a translation of Muratori's "History of Italy." Some time after a new apprentice, Nessig, arrived, and Perthes and he, both discovering that they were in love with Frederika, confided the fact to each other, and agreed that the one who failed should bear his fate without complaining. In 1793 he went to Hamburg, as an assistant to Hoffmann, Nessig undertaking the task of giving a trustworthy account of the state of Frederika's affections. After remaining 3 years with Hoffmann, he entered into partnership with Nessig. Both hereupon offered themselves to the daughter of their old master, and were both refused, although she admitted that she loved both. Perthes for a time felt the disappointment keenly, so much so that he wrote: "My whole life-plan is ruined, ruined by her;" but in process of time he recovered from his despair, and subsequently going into business alone, he married the daughter of Claudius, editor of the *Wandsbecker Bote* newspaper. While an apprentice to Böhme, he had made the acquaintance of Goethe, Herder, and Schiller, and now became known to other literary men, among whom were F. H. Jacobi, the Stolbergs, Voss, and Reventlow. In 1799 he entered into partnership with Besser, and the business of the firm went on prosperously until Hamburg was incorporated into the French empire. Even then it flourished in spite of the Berlin and Milan decrees, and of the censorship of the press. But his hostility to the French, when they retired from Hamburg before the Russians in 1813, made him a marked man, and on their return he was forced to fly, and his establishment was plundered. During all of these trials he was sustained by his wife, who thanked him that his name "stood among the 10 enemies of the tyrant," and, although in extreme destitution, encouraged him to do his duty. In 1814 he returned to Hamburg, and the firm regained its old prosperity. Dissolving his connection with Besser, he went in 1822 to Gotha, where he engaged still more largely in publishing, issuing works chiefly on history and theology. Here he published the *Almanach de Gotha*, the "General History of the States of Europe," edited by Heeren and Ukert, and the works of Neander, Tholuck, Bunsen, Ullmann, and many others. He afterward gave up his business to his son Justus, by whom it is now conducted. The correspondence of Perthes was extensive and valuable, and specimens of it may be found in "The Life of F. Perthes" (3 vols. 8vo., 1848–'55), written by his son Clemens Theodor. This work after some condensation was translated into English (2 vols. 8vo., Edinburgh, 1856).

PERTHSHIRE, one of the largest counties of Scotland, situated near the centre of that kingdom, bounded N. by the counties of Inverness and Aberdeen, E. by Forfar and Fife, S. by Kinross, Clackmannan, and Stirling, and W. by Argyle; area, 2,836 sq. m.; pop. in 1851, 138,660. It is divided into the highland and lowland districts, the extent of the former being much the greater; and these are again subdivided into the ancient and popularly known divisions of Monteith, Athole, Strathearn, Breadalbane, Rannoch, Stormont, Perth proper, Gowrie, Balquhidder, and Glenarchy. The chief towns are Perth, Crieff, and Dunblane. The principal rivers are the Tay, the basin of which comprises nearly the whole county, the Forth, Earn, and Teith. The chief lakes are Loch Tay, Loch Ericht, Loch Rannoch, and Loch Katrine, all remarkable for the beauty of their scenery. Some of the mountains of the Grampian chain in Perthshire are among the highest in the island, three of them being nearly 4,000 feet above the sea. The extensive valleys called "straths" are very remarkable, and also the glens, the best known of which is Glen Tilt. The soil is mostly deep rich clay. There are some manufactures, but Perthshire may be regarded as an agricultural county. The land under crops is estimated at ¼ of the whole area. The fisheries on the Tay are very valuable. Perthshire returns two members to parliament, one for the county and one for the city of Perth.

PERTZ, Georg Heinrich, a German historian, born in Hanover in 1795. He was educated at the university of Göttingen. In 1819 he published a "History of the Mayors of the Palace under the Merovingians," which attracted the attention of Baron Stein, who soon after associated its author in his own project of a collection of the German historians of the middle ages. Pertz now undertook a series of journeys through Europe for the purpose of exploring libraries and museums. In 1832 he became a member of the Hanoverian representative chamber, and in the same year established the "Hanoverian Journal." He was made a privy councillor of the court of Berlin in 1842, and became director of the royal library in that city and member of the academy of sciences. His great undertaking is the editing of the *Monumenta Germaniæ Historica* (13 vols., 1826–'56).

PERU. I. The capital of Miami co., Ind., on the Wabash river and canal, and on the Toledo and Wabash and Peru and Indianapolis railroads, 75 m. N. from Indianapolis; pop. in 1860 estimated at 3,500. It is the business centre of a rich agricultural district, and has a valuable trade. There are a handsome court house, a gaol, 2 newspaper offices, 1 flour mill, 1 woollen factory, 1 distillery, 2 founderies, and 6 churches, viz.: 1 Baptist, 1 Episcopal, 1 Methodist, 2 Presbyterian, and 1 Roman Catholic. II. A city of La Salle co., Ill., at the head of navigation on the Illinois river, 60 m. above Peoria, on the Chicago and Rock Island railroad, 100 m. from Chicago, and about 1 m. from the junction of the Illinois central railroad with the Illinois and Michigan canal; pop. in 1860, 3,134. It is healthfully and handsomely situated, surrounded by fine scenery, and enjoys a very active business. The river furnishes extensive water power, and it has become one of the principal manufacturing towns of the state. Coal abounds in the vicinity. In 1857 the arrivals were 291, and the amount of steam shipping owned in the place was 4,700 tons. The receipts of lumber were upward of 10,000,000 feet, and 337,000 bushels of wheat, 625,000 of Indian corn, 161,000 of oats, and 48,000 bbls. of flour made in the city, beside immense quantities of coal, were exported. It contains a number of manufactories and a large ship yard, dry dock, and marine railway. There are also 2 banks, 3 hotels, 3 weekly newspapers, and 6 churches, viz.: 1 Congregational, 1 Episcopal, 1 Lutheran, 2 Methodist, and 1 Roman Catholic.

PERU, a republic of South America, bounded N. by Ecuador, E. and S. by Brazil and Bolivia, and W. by the Pacific ocean, extending from lat. 3° 35′ to 21° 48′ S., and from long. 65° 10′ to 81° 30′ W.; extreme length about 1,250 m., breadth 750 m. in the N. and 60 m. in the S.; area about 500,000 sq. m. The republic is divided into 11 departments, and 2 provinces which have the organization of departments. The departments are subdivided into 61 provinces, the provinces into 625 districts, and the districts again into parishes. The departments, with their capitals and population (not counting Indians) in 1853, were as follows:

Departments.	Population.	Capital.
Amazonas	39,074	Chachapoyas.
Anchas	155,779	Huaras.
Arequipa	121,585	Arequipa.
Ayacucho	129,921	Ayacucho.
Cuzco	346,211	Cuzco.
Huancavelica	76,198	Huancavelica.
Junin	245,722	Cerro de Pasco.
Libertad	202,662	Truxillo.
Lima	180,928	Lima.
Moquegua	61,440	Tacna.
Puno	245,681	Puno.
Callao, province	8,352	Callao.
Piura, "	74,872	Piura.
Total	1,887,920	

The statistical accounts recently published by Mr. G. Davila Condemarin, of the university of Lima, represent the area as 512,122 sq. m., and the population 2,500,000, viz.: of Spanish descent, 900,000; descendants of Indians, 1,400,000; negroes and mixed races, 200,000. —The sea coast of Peru stretches along the Pacific for about 1,500 m., from the mouth of the river Tumbez on the N. to that of the Loa on the S. Its general character is bold, with deep water close to the shore, in some places 70 or 80 fathoms within a short distance of the cliffs. About 300 m. of the N. extremity is broken by bays and headlands, and the remainder of the coast forms three successive and almost straight lines, running respectively about S. S. E., S. E., and S. The northern part however is not so bold as the southern, and has a greater proportion of sandy beach; but high land is always seen at a little distance inland. In its whole extent there are but few ports of any consequence, many of them being open roadsteads, or at least but very imperfectly sheltered. The bays of Callao and Payta are the most secure anchorages, and most frequented by foreign shipping, the latter being a favorite resort for American whalers. The most important islands upon the coast are those in the neighborhood of Pisco, more particularly the Chinchas (see CHINCHA ISLANDS); the island of San Lorenzo, which forms the harbor of Callao; and the Lobos islands, which lie between lat. 6° and 7° S., and like the Chinchas are covered with extensive deposits of guano. (See LOBOS.) There are no hidden dangers near any of these islands, and like the coast they have deep water close to the shores. Along the whole coast the swell rolling in from the Pacific breaks in a heavy surf, which renders landing in most places dangerous, and often impossible for boats. In exposed positions rafts called *balsas* are used by the natives for landing or embarking goods or passengers. In the N. these rafts are formed of logs of light wood lashed together, with a raised platform upon which the cargo is placed; and where the surf is very heavy, they are made of bundles of reeds. Along the S. coast the platform is supported upon inflated skins.—The most remarkable natural feature in Peru is the vast chain of the Andes, which traverses the country in a general S. S. E. and N. N. W. direction. It here forms two parallel ridges, the W. of which is sometimes distinguished as the Cordillera, while the E. retains the name of the Andes. They are connected by several transverse branches, and where the one is highest the other is most depressed. The E. ridge preserves its grand character from Bolivia to lat. 13° S., where it loses it, and N. of the Nevada de Sacantahi no snow-capped mountains occur. In the W. chain, near lat. 15°, a considerable portion of the range is covered with snow; S. E. of Lima the Taldo de Nieve rises above the snow line, and about lat. 11° the summit of La Vinda and several others are nearly 16,000 feet in height. Between La Vinda and Chimborazo in Ecuador none of the summits of this chain attain the snow line. The W. ridge is broader, wilder, and more rugged, and its summits are less pyramidal than those of the other, which terminate in slender sharp peaks, like needles. (See ANDES.) The W. ridge forms the water-shed between the rivers which flow to the Atlantic and those which reach the Pacific. All the waters of the E. declivity work their way through the other range to the Atlantic, while there is no instance of the Cordillera being intersected by a river; a remarkable fact, because in S. Peru and Bolivia it is the lower chain. The rivers of Peru that fall into the Pacific are all short, shallow, generally rapid.

and useless for navigation. The great rivers of the country all unite in forming the principal branch of the Amazon. They are generally of considerable depth, and in the course of time will doubtless be navigated by steamers from the Atlantic ocean. The chief streams are the Marañon, Huallaga, Ucayali, and Purus, the last of which forms part of the boundary line between Peru and Bolivia. With the exception of Titicaca, the lakes of Peru are small. Lauricocha is the source of the river Marañon; Chinchaycocha gives rise to the river Jauja; and Urcos is a small lake to the S. of Cuzco. Lake Titicaca is 115 m. long and 46 m. broad, contains many islands, and is situated 12,200 feet above the level of the sea.—The tract called *la costa*, between the steep ascent of the Cordillera, or W. Andes, and the Pacific, varies in width from 10 to 60 m., and slopes toward the ocean with a very irregular surface and rapid descent, furrowed by a number of deep depressions or gullies, which run from the mountains to the sea. These gullies are generally traversed by rivers, most of which are dry during a great part of the year. Rain never falls in the lower part of this region, and vegetation does not extend beyond the banks of the streams. The ridges between the rivers are complete deserts, varying in breadth from 10 to 20 m. The surface is very uneven, and is covered with hillocks of considerable size, composed of fine, light yellow drift sand, which is often driven about with great velocity by the wind and ascends in columns to the height of 80 or 100 feet. All traces of a path between the river valleys are thus obliterated, and no stranger can travel from one to another without a guide, who generally directs his course by the stars at night, and by the wind during the day, which always blows from the south. The region called *sierra*, or highlands of Peru, begins where the rainless district terminates, about 7,000 feet above the level of the sea, and extends from the Cordillera to the chain of the Andes. These chains are generally about 100 m. apart, and between them lie the table-lands, naturally distributed into regions differing widely in character. The chief of these are the heights of Pasco and Cuzco, and the valleys of the Jauja and the Marañon. The first lies between lat. 10° 30' and 11° S., and has a general height of 14,000 feet; it is traversed by chains of hills from 500 to 1,000 feet high, and has everywhere a rugged and forbidding aspect. The table-land of Cuzco extends about 100 m. each way. At the city of Cuzco, in lat. 13° 30' S., it has an elevation of 11,380 feet above the sea, but sinks rapidly toward the N., so that upon the banks of the Mantaro it is probably not more than 8,000 feet high. The valley of the Jauja adjoins the table-land of Pasco, descending rapidly S. for about 100 m., and in its general character resembles Cuzco. The valley of the Marañon extends between lat. 5° and 10° S., and is for the first 100 m. little more than a narrow gorge descending rapidly; it then becomes for 200 m. a wide and fertile country, having a mean height of about 3,000 feet above the sea. The most valuable part of the Peruvian territory, however, is the *montaña*, or wooded region, which lies to the E. of the Andes, extending from their E. declivity to the boundaries of Brazil and Bolivia. This region is watered by the Huallaga, Ucayale, Marañon, and many tributary streams. It is sometimes called Pampas del Sacramento, or Collena, or the "Land of the Missions," in consequence of the Jesuits having established several missions in it shortly after the conquest of Peru. There are extensive plains traversed by hills of inconsiderable height, the whole covered with one dense forest of luxuriant growth.—The geological character of Peru, except in particular localities, has not been well examined. Red sandstone is met with both on the coast and in the interior, often accompanied by vast deposits of salt. Granite and porphyry appear on the coast and in the highlands; and the commonest rocks on the sierras are trachyte, augite, porphyry, and diorite. Between Lake Titicaca and Cuzco, the more elevated ground bordering the valleys is formed chiefly of clay slate; and in the neighborhood of Arequipa, and from thence to Lake Titicaca, the soil is volcanic. In the province of Tarapaca, and in the neighborhood of Iquique, there is an extensive deposit of salt, nitre, and nitrate of soda; and the sandy region over which it extends, between lat. 19° and 22° S., is a complete desert. In many parts the houses are built of blocks of salt. In the coast district earthquakes are frequent, and sometimes very destructive. It is estimated that the coast of Peru has risen 85 feet since it was first inhabited. Since the great earthquake of 1746, the coast about Callao, which was raised upon that occasion, has been gradually sinking. The water courses further inland, toward the base of the mountains, furnish proof of great natural convulsions, many of them which exhibit the wear of centuries being now dry. It has been already stated that the region bordering upon the coast is a barren desert; but in the gullies, where there is sufficient water to irrigate the ground, abundant crops are produced from the sandy soil, which the cultivators manure with guano. Some of the highlands are exceedingly fertile; and the territory E. of the Andes is said to be among the richest in the world.—Peru has four climates: 1, that of the coast, upon a portion of which rain has never been known to fall, and on the greater part of which a shower is considered very remarkable; 2, that of the sierras, or highlands, which is mild and variable, with moderate rains; 3, that of the Cordillera and Andes, which is exceedingly cold; and 4, that of the territory to the E. of the Andes, which is warm and damp. The first climate, or perfectly rainless region, terminates at about 400 feet above the level of the sea, and from thence to an elevation of 7,000 feet extends a tract periodically refreshed by sea vapors or drizzle, called *garua*. These vapors continue from May to November, when the country bordering the coast desert becomes covered with vegetation. About Lima, 600 feet above the level of the sea, this vegetation is most abundant during the months of July, August, and September. Toward December, when the dry season may be reckoned to have set in, the weather, except for an interval at noon, is for the most part cool and delightful. The cold current which runs along this coast from the seas adjoining Cape Horn, the temperature of which is on an average 8° lower than the mean annual temperature of the atmosphere at Callao, contributes greatly to moderate the heat of the climate on the shore of Peru. The mean heat at Callao, in lat. 12° 4′, does not exceed 60°, and Humboldt states that he saw the thermometer as low as 55°. At Lima, in almost the same latitude, 7 m. inland from Callao, and 600 feet higher, the thermometer never falls below 60° in winter, and seldom rises in summer above 80°. The hottest day ever known in Lima was in Feb. 1791, when the thermometer rose to 96°. In Piura, the extreme N. province of Peru, the temperature ranges in summer from 80° to 96°, and in winter from 70° to 81°. The situation of the coast region, placed between the influences of the ocean current on the one side and the lofty mountains on the other, makes the climate temperate, as the breeze is cooled by either the sea or the Andes. During the dry season on the coast heavy rain falls in the interior, upon the W. slopes of the Cordillera and the tablelands, especially in the months of January, February, and March, and copious streams pour down to fertilize the ground lying upon the river banks. During the greater part of the year the winds upon the coast blow from the S., varying from S. S. E. to S. W.; but in the winter months N. breezes are occasionally met with. At some distance from the shore the S. E. trade wind prevails, but with greatest strength in winter. Lightning is sometimes seen on the coast of Peru, but thunder is never heard, and storms are quite unknown. In the 2d climate, in the district of the sierras or highlands, there is a considerable range of temperature between the rain line, at about 7,000 feet above the sea, and the snow line, which varies in height according to latitude. About 9,000 feet above the sea the average temperature is about 60°, varying little throughout the year, and the seasons are only distinguished as the wet and the dry, the former of which lasts from November to May. The 3d climate occurs in a district covered with perpetual snow. The 4th climate is entered after descending the E. face of the Andes and arriving at the plains and undulating country which extend to the boundaries of Brazil and Bolivia. The climate of this region is warm and moist; but the heat is not so great as might be expected in a country lying so close to the equator. The forests prevent the rays of the sun from reaching the ground; and the moist winds which blow from the Atlantic, over the plains watered by the Amazon and its tributaries, are stopped in their progress toward the Pacific by the Andes, and accumulate clouds which descend in heavy rains accompanied by storms of lightning and thunder. These copious rains cause such an excess of moisture, that the region is very unhealthy, and few individuals among the Indian tribes scattered along the banks of the rivers reach the age of 50 years.—The mineral productions of Peru, more particularly the precious metals, have been famous ever since the discovery of the country. Gold is found in many places, and nearly all the mountain streams wash it down in small particles. The mountains are interspersed with veins of gold and silver ores, and with copper and lead. In many places gold is found in quartz. The silver ore is particularly rich, frequently yielding from 5 to 50 per cent. This ore constitutes the great mineral wealth of the country, and presents itself in all forms and combinations, from the pure metal to the lead ore mixed with silver. It is found at the highest elevations yet reached. Quicksilver is also found, but in small quantities. The only quicksilver veins yet discovered of any magnitude are at Huancavelica, and on the Ucayale river. The Andes are very rich in copper ore; but it is extracted only from their W. ridge, as the difficulty of transport from the other to the coast is too great to make the working of the mines profitable. The lead and iron mines are not worked. Mining in Peru is still in a very backward state. The great height at which most of the mines are situated, the want of timber, the impossibility of transporting machinery over such roads, and the high price of the necessaries of life, present great difficulties in the way of improvement. The silver produced between 1630 and 1803 has been calculated to amount to $1,232,000,000. In 8 years (1826–'33) the silver coined at Lima alone amounted to $20,000,000. Humboldt estimates the average annual yield of the gold and silver mines in Peru at $5,300,000. In 1825 some English miners discovered good coal at Cerro de Pasco, and lately it has been found 18 m. S. from Tumbez. Not far from Arica, brown coal is found on the coast; and in the province of Tarapaca there is a subterranean forest, the wood of which affords excellent fuel and is used extensively in the preparation of saltpetre.—Peru is exceedingly rich in vegetable productions; and each of its natural regions has its own flora. The coast district has not many plants; but E. of the Andes the species are exceedingly numerous. Many species of medicinal herbs, and a great variety of aromatic balsams, oils, and gums, are produced. Trees and shrubs which yield 7 different kinds of wax are known; and according to Peruvian writers this territory is a new world in itself. Almonds, ginger, the balsam of copaiba, gum copal, &c., are all said to abound. On the montaña and the W. slopes of the Andes are produced the cabbage palm, the cocoanut, the chocolate nut, the cotton shrub, the pineapple, turmeric, plantain, and sugar cane, beside some trees that have only Peruvian appellations. The *coffea racemosa* is found in the interior, and the berries are used in the same way as those of the cultivated species. The large-flowered jasmine and the *datura arborea* are abundant in the vicinity of Lima, and are much used by the women for wreaths and for braiding in their hair. No fewer than 24 species of pepper and 5 or 6 of capsicum are reckoned natives; there are several species of *solanum*, or plants of the potato genus, and the potato commonly called the Irish was originally brought from Peru. Tobacco and jalap are abundant in the groves at the foot of the mountains; and many of the flowers cultivated in greenhouses and gardens in other countries grow wild in the forests. Cotton is found in great abundance in a wild state on the banks of the Amazon and its tributaries. Among the numerous shrubs which clothe the highlands, the different species of cinchona or Peruvian bark are the most valuable. It is scattered along the skirts of the Andes over an extent of 2,000 m., at an elevation of from 2,800 to 9,500 feet, and therefore thrives in a great variety of climates. On the E. declivity of the Andes it forms a continued forest for many miles. Caoutchouc is procured from the inspissated juice of a variety of different plants. The tree ferns range between 1,500 and 5,000 feet above the sea; beyond the height of 10,500 feet arborescent vegetables disappear; between 6,500 and 13,500 feet the alpine plants are found; species of the *Winteria* and *Escallonia* occur between 9,200 and 10,800 feet, and form scrubby bushes in the cold and moist climate. —There are extensive tracts on the W. side of Peru in which life seems to be almost wholly extinct. Among the wild animals of the country are the puma, jaguar, bear, deer, wild boar, fox, skunk, armadillo, sloth, and several species of monkey. The Peruvian sheep is the most valuable indigenous animal of the country. There are 4 varieties, the llama, alpaca, guanaco, and vicuña. The Spaniards introduced the European sheep into the country, and flocks of 50,000 to 100,000 may now be met with in the highlands. They also introduced horses, horned cattle, and asses; and the mule is now the ordinary beast of burden. In the valleys and toward the coast the imported animals have thriven, but on the heights they are much degenerated in size. Alligators are found in the rivers, and seals are very common along the coast. There are numbers of tortoises, and several species of serpents, but the latter are not often seen. The shores of Peru are frequented by myriads of sea birds, and to them the world is indebted for the valuable manure called guano. In the days of the incas these birds were protected by law during the season of incubation. The common carrion vulture frequents the towns in great numbers, and there are 4 species of condor. Many parrots are found in the E. district. Hawks, falcons, owls, pigeons, and other birds are abundant; and all the domestic fowls have been introduced.—The inhabitants of Peru consist of Spaniards, various tribes of native Peruvian Indians, and negroes, and of every conceivable admixture of them all. The native Peruvians or Indians are exceedingly ignorant, but a few of them have risen to eminence, and display great ability. Some of the tribes cultivate the soil, and others are principally engaged in manufactures. The ranks of the army are recruited from among them, and in the war of independence they showed great bravery. In March, 1858, under Vivanco, at Arequipa, out of a regiment 600 strong, 540 were killed and wounded before they submitted to Castilla. The pure-blooded descendants of the Spaniards are much inferior in number to those of mixed race. They are fickle and incapable of much mental labor, and addicted to cock fighting and all sorts of gambling. The women are remarkable for their personal attractions, elegant taste, natural cleverness, and pleasing manners; but they lose their bloom at an early age. The negroes are altogether confined to the towns near the coast and to seaports; with the mulattoes, &c., they form a very turbulent and unruly portion of the community.—Agriculture is not much attended to in the maritime districts, and Lima and many other towns near the sea depend upon imported provisions, which are chiefly brought from Chili. In the plains of Caxamarca large crops of barley and wheat are raised, the latter yielding from 18 to 21 fold. Between the elevations of 2,000 and 10,000 feet the fruits and cereals of the temperate climates are cultivated; but as no carts or wagons can travel these regions, and there exists no means of transporting produce to the country below except on the backs of mules, only sufficient grain is raised to supply the immediate wants of the district where it is grown. The manufactures of Peru are inconsiderable. Some cotton and coarse woollen fabrics, straw hats, mats, and a few other articles are made. Tanning, dyeing, soap making, distilling, and some other manufactures are carried on. Gold and silver filigree work and lace are made at Lima.—The principal exports are the precious metals, guano, nitrate of soda, wool, cotton, hides, Peruvian bark, sugar, olive oil, pisco (a spirit made chiefly in the neighborhood of the place from which it takes its name), and some wine of excellent quality. In 1854, 244,400 tons of guano were shipped, and it is calculated that the country now has enough of this manure to permit the exportation of 100,000 tons annually for 250 years. The imports consist of woollen, cotton, and linen goods, machinery, cutlery, earthenware, provisions, &c. The trade of Peru with other countries was as follows in 1853:

Countries.	Imports.	Exports.
Great Britain	$4,606,290	$8,818,755
France	1,888,780	1,441,605
Chili	654,000	497,485
United States	586,025	4,883,880
Hamburg	486,825	214,815
China	289,495	....
Ecuador	195,825	....
Spain	162,865	228,995
Antilles	....	264,240
Other countries	212,775	516,080
Total	$9,087,880	$16,865,805

In 1856, 871 vessels with an aggregate burden of 219,215 tons entered the ports of Peru from Great Britain and her possessions, importing goods to the value of $17,421,200; and 77 vessels, with an aggregate burden of 34,056 tons, cleared directly for the same destinations, taking exports to the value of $6,723,200. In the same year 61 vessels, tonnage 31,967, entered from French ports, and 33, tonnage 16,376, sailed with return cargoes, the value of the imports being $4,054,600, and of the exports $5,567,600. In 1853 the merchant vessels registered in the different ports of Peru numbered 187, tonnage 25,228. Ship building is not carried on, and the greater part of the vessels carrying the Peruvian flag are old and only fit to make voyages upon a coast where storms are quite unknown. They are principally craft from the United States and different countries of Europe that have been condemned and sold upon the S. W. coast of America for unseaworthiness. The internal trade of the country is very limited. Railroads have been opened between Tacna and Arica, Lima and Callao, and Lima and Chorillas, a fashionable watering place agreeably situated on the coast a few miles S. of Callao; but except upon the table-lands there are few roads of any description.—Education is in a low condition in Peru, but symptoms of improvement are apparent. The education of the lower orders is almost completely neglected, and in the interior of the country it is sometimes difficult to procure men qualified for a public office by merely being able to read and write. The university of St. Mark at Lima, established in 1570, is the most ancient university in America, but is not very well attended. The established religion is the Roman Catholic, and but little toleration is extended to other creeds. The church is immensely rich; its head, the archbishop of Lima, has 4 suffragans, the bishops of Arequipa, Truxillo, Cuzco, and Huamanga. There are 1,800 priests, 720 monks, and 1,200 nuns. Beside the regular clergy, there are missionaries appointed for converting the aboriginal tribes.—In theory the government is based upon popular representative principles, but in practice it has degenerated into a military despotism. According to the constitution, the president is elected for 6 years. There is no vice-president, and in case of a vacancy occurring the president's place is supplied by the president of the executive council. The cabinet is composed of 4 ministers, namely, for foreign affairs, justice and religion, war, and finance. The congress is composed of a senate and chamber of deputies. Each department sends two members to the senate; and the chamber of deputies is composed of one representative for every 20,000 inhabitants, or for every fractional part above 10,000. The departments are governed by prefects under the direct authority of the president; and at the capital of each there is a *junta* formed of two members from each of its provinces. There is a supreme court at Lima, and superior courts sit at Lima, Cuzco, Arequipa, Truxillo, Ayacucho, and Puno. The judges are appointed by the president, but cannot be removed at his pleasure. Capital punishment has been abolished for political offences. By a law lately made, illegitimate children are entitled to a share of their parents' personal property. The land force consists of about 10,000 men, with an unusually large proportion of officers; and the naval force of one screw frigate, 7 other steam vessels of war, and a few smaller vessels. In 1857 the revenue amounted to $18,656,256, of which $15,296,952 was derived from the profits upon the sale of guano. In the same year the expenditure was $16,360,051. On Jan. 1, 1858, the national debt amounted to $46,451,387. The currency of the country is in a very unsatisfactory condition, and the attempts lately made to improve it have been too limited to afford relief. Counterfeit money is so plentiful that in trifling transactions it may be said to pass current; and the Peruvian coin is so much debased that the dollar is in reality worth little more than 80 cents.—The early traditions and history of Peru have been treated in the article INCA. About 1511 Vasco Nuñez de Balboa, the Spanish governor of a small colony in Darien, first learned from a native chief that there was a country to the southward where golden vessels were in common use, and where that metal was of as little value among the people as iron appeared to be among Europeans. Balboa raised a considerable force of Spaniards, and together with 1,000 Indians started to invade the promised Eldorado. The march across the isthmus, though only 60 miles, occupied 25 days; and when he came in sight of the Pacific he formally took possession of that unknown sea and all that it contained in the name and on behalf of the king of Castile. After penetrating about a degree further south he returned for reënforcements; but he was superseded in his command, and the attempt to reach Peru was discontinued. In 1519 the capital of the colony of Darien was removed from the Atlantic side of the isthmus to near the present site of the city of Panama, and shortly afterward an association was formed for renewing the attempt to explore and conquer Peru. Francisco Pizarro, who had accompanied Balboa on the former expedition, was at the head of this enterprise; and his colleagues were Diego de Almagro, an illiterate adventurer like himself, and Hernando de Luque, vicar at Panama. Luque supplied the greater part of the funds, while the others engaged to do the fighting. Pizarro sailed from Panama in Nov. 1524, in a small vessel with about 100 men; but after seeing enough of the country to be convinced of its wealth, he was obliged to return without accomplishing any thing. Having visited Spain, obtained a royal grant of the territory to be conquered, and procured recruits, among whom were his 4 brothers, he set sail again in Jan. 1531, with 3 vessels, 180 men, and 27 horses, leaving Almagro behind to collect reënforcements. Landing at St. Matthew's bay, about lat. 1° N., after they had been 14 days at sea, the adventurers plundered a town in the province of Coaque; and being reënforced by the arrival of about 130 men, they began building a town in the valley of Tangarala, calling it San Miguel. The empire of the incas was now distracted by civil war between the two brothers Huascar and Atahualpa, to whom their father Huayna Capac had bequeathed equal shares of his kingdom. Atahualpa had recently gained a complete victory over his brother and taken him prisoner, and was now encamped with his army at Caxamalca, whither Pizarro marched to meet him, in Sept. 1532, at the head of 177 men. Received with apparent friendship, he managed treacherously to make the inca captive, and massacred a host of Indians, whose number is stated as high as 10,000, without losing one of his own men. The Peruvian army fled in dismay. Atahualpa offered as the price of his liberty to fill the apartment in which he was confined with gold; but after the precious ornaments of the temples and palaces had been contributed in amount equal when melted down to more than $17,500,000, Pizarro caused his royal captive to be put to death, Aug. 29, 1533. The Spaniards now marched toward Cuzco, the Peruvian capital, their force having by this time been increased to nearly 500 men, one third of whom were mounted. They entered the city Nov. 15, after defeating the natives in a fierce battle, and proclaimed as inca a half brother of Atahualpa named Manco Capac; the captive Huascar had been assassinated by order of Atahualpa a short time before the latter's death. Pizarro now determined to build a new capital near the coast, and the valley of the river Rimac was selected as its site. It was founded Jan. 6, 1535, and called Ciudad de los Reyes, or "city of the kings;" its present name has been derived from that of the river, which the Spaniards softened into Lima. In the mean time Manco had not proved the ready tool which the conqueror expected to find him. Exasperated at the treatment he received, the young prince escaped from Cuzco and raised a native insurrection. That city was besieged by overwhelming numbers, who set fire to the houses with burning arrows and red-hot stones. One of Pizarro's brothers was killed; many of the Spaniards who resided on farms cultivated by the forced labor of the Indians were massacred; reënforcements were cut off; Jauja was also attacked, and Lima was threatened, but the Peruvians were at last obliged to raise the siege in order to go home and cultivate their fields, or starvation had surely overtaken them. During the progress of these events Almagro had led an expedition southward to conquer Chili, the Spanish monarch having granted to him in 1534 all the country for 200 leagues S. of that bestowed upon Pizarro; but after penetrating as far as lat. 30° S., and undergoing the most incredible sufferings, he returned to Cuzco, claiming that it fell within the limits of his grant. The dispute resulted in open war, and a battle was fought June 26, 1538, resulting in the defeat and capture of Almagro and his subsequent execution. The condition of the country was now deplorable. All the ancient institutions were overthrown, and the rights of Indians and Spaniards were equally disregarded. The conquerors had apportioned the land and inhabitants together as the spoils of victory, and the Peruvians were reduced to the worst kind of slavery, aggravated by the fact that there were often two or more white men each claiming to be master of the same serf. Thus Manco Capac had little difficulty in raising them to arms whenever he saw fit. Pizarro proposed, as a means of checking these disorders, to establish military settlements in the country, strongly fortifying the houses, and giving to each settler a certain portion of land and a certain number of serfs to cultivate it. Reports of his oppressions finally reached Spain, and in 1540 Vaca de Castro was sent out with the commission of royal judge to examine into the state of affairs, and if possible to improve it. In case of Pizarro's death, he was to produce his warrant as royal governor. But before he could reach Lima Pizarro had been assassinated by a band of conspirators led by the son of Almagro. The young Almagro proclaimed himself governor, collected a considerable force, and gave battle to Castro near Jauja, Sept. 16, 1542. Defeated after an obstinate struggle, he was made prisoner and put to death, and Castro applied himself with considerable success to improving the condition of the country. He was soon superseded however by Blasco Nuñez Vela, who came charged with the execution of some new regulations for the colony, the most important of which respected the condition of the Indians. It was declared that all slaves should be free on the death of their masters; that Indian vassals of the crown and slaves whose masters had used them ill or had taken part in the factions of Almagro and Pizarro should be free at once; and that the Indians should be moderately taxed, and should not be forced to labor where they did not choose. These measures raised a storm of discontent, and the colonists looked to Gonzalo Pizarro, the last of that family now left in Peru, as their only hope. Gonzalo accordingly assumed the title of procurator-general of Peru, and, favored by the rashness of the viceroy, who was finally deposed by the *audiencia*, soon collected a formidable force, entered the capital, and assumed regal state. The news of these proceedings caused great consternation in Spain, and Pedro de la Gasca, who, though a member of the priesthood, had distinguished himself both as a soldier and a statesman, was sent out to draw the people back to their allegiance. He was invested with all the powers of the sovereign. In the mean time Gonzalo had seized the forts upon the isthmus of Panama in order to intercept any force from Spain, but no danger was apprehended by his officers from a poor priest who came without a retinue. By his promises of pardon to all who should join him, Gasca gained possession of the fleet at Panama in Nov. 1546, and afterward by the same inducement succeeded in raising a considerable force, with which he sailed for Peru in April, 1547. He was received with great enthusiasm. Gonzalo retreated from Lima, and afterward gained a victory over some royalists; but Gasca raised a force of 2,000 men, the largest European army that had yet been assembled in South America, and followed him to Jaquijagua, where, his troops deserting, he was made prisoner, and shortly afterward executed. The war having been brought to a close, Gasca turned his attention to establishing the government of the country upon a more satisfactory footing than had hitherto been attempted. He left Peru in Jan. 1550, and arrived in his native country after an absence of 4 years. With a few trifling exceptions, the colony remained quiet for many years, and the authority of the Spanish crown was completely established. The empire of the incas, with some slight alterations of boundaries, became one of the 4 viceroyalties of Spanish America. In 1718 the province of Quito was separated from it and annexed to the newly created viceroyalty of New Granada. The Peruvians under Tupac Amaru, a pretended inca, rebelled in 1780, but were easily subdued. In 1788 the provinces of La Plata, Potosi, Charcas, Chiquitos, and Paraguay were separated from Peru to form the government of Buenos Ayres; and Guatemala, Venezuela, Caracas, Cumana, and Chili were formed into separate administrations. In the war of independence, Peru was the last of the Spanish American possessions to rebel against the mother country, and the Spanish forces remained in it unmolested for some time after they had been expelled from the neighboring colonies. In 1820 Gen. San Martin entered the country at the head of an army of Chilians and Buenos Ayreans, and took possession of the capital. After a succession of victories, the Spaniards were compelled to retire to the interior. The independence of Peru was declared July 28, 1821, when San Martin was proclaimed protector. He afterward became unpopular, and in Feb. 1824, Bolivar was made dictator. The Spaniards maintained the contest with great obstinacy, and it was not until their defeat at Ayacucho that they were finally expelled. Bolivar resigned the dictatorship in 1825, after having matured his plans for separating the S. and S. E. provinces to form a new republic which adopted his name. A revolution took place in 1826, when the constitution adopted by Bolivar was abolished, and a new one framed, founded upon that of the United States. In 1836 Santa Cruz, president of Bolivia, taking advantage of an invitation from some disaffected parties in Peru, entered the country with an army, and succeeded in reducing it after several sanguinary engagements. Santa Cruz was proclaimed supreme protector, and N. Peru, S. Peru, and Bolivia were united in one confederation. The protector's troops were defeated at Yungay in 1839, and the confederation brought to a close, when Peru and Bolivia returned to their previous forms of government. A congress assembled, and Gamarra, who then governed provisionally, was appointed president. Gamarra was killed in battle in Bolivia in Nov. 1841, and Menendez, president of the council of state, succeeded him, but was forcibly deposed in Aug. 1842, by Gen. Forico. A series of civil wars now ensued, and the country passed successively into the hands of Vidal, Figuerola, and Vivanco. Gen. Don Ramon Castilla brought these struggles to an end in 1844, and replaced Menendez in power; when, a congress being called to choose a president in accordance with the constitution, Castilla himself was elected. He took possession of the government, April 1, 1845, and for 6 years order and peace were maintained. In 1851 Gen. Rufino José Echenique was elected president. His government was accused of the grossest frauds, and Castilla took advantage of the dissatisfaction of the people to stir up a revolution in the south. After several battles, Castilla gained a complete victory over Echenique's troops near Lima in the early part of 1855. The effects were decisive, and Peru was placed at his disposal. Castilla was not allowed to enjoy his power long in peace, for Vivanco incited an insurrection against him, and gained over the commanders of all the ships of war except a small steamer which was protected by the mole of Callao, and another which happened to be in China at the time. The fleet threatened to take Callao, and Castilla, alarmed for its safety, raised a force of nearly 400 Europeans and North Americans under the command of an artillery officer named Smith, who had already taken part in all the battles that had placed the president in authority. This force garrisoned the fort of Callao, and repulsed Vivanco's attack with such severe loss that he retired to Arequipa, a place which had always been attached to him. His fleet kept possession of the sea, and at one time held the Chincha islands. On Jan. 24,1858, two American vessels, the Lizzie Thompson and Georgiana, were captured while loading guano on the coast of the province of Arequipa, by a small steamer of Castilla's; and several other ships were subsequently seized under similar circumstances. Though there are extensive deposits of guano in other places, the laws of Peru only permit it to be exported to foreign countries from the Chincha islands. The ships in question were furnished by an officer of Vivanco's with permits to load at the places where they were seized; but although that chief was at the time in possession of the surrounding territory, the government of Peru refused to acknowledge them as any authority. The ships were removed to Callao, where they were confiscated and both captains and the mate of the Georgiana imprisoned; but they were released upon security after being confined for 8 days. The Peruvian government have since steadily denied all redress, and their refusal to pay $150,000, the amount claimed by the owners of the Lizzie Thompson and Georgiana, to indemnify them for their losses, led to the withdrawal of the U. S. minister from Lima in the autumn of 1860. Arequipa was taken by assault by Castilla in March, 1858, after a most obstinate and gallant defence, in which Vivanco had about 8,000 of his men killed and wounded. Though slavery was abolished in Peru by the charter of independence, it still existed till Castilla freed the slaves by proclamation in 1855. When the Spaniards conquered the country, they subjected the Indians to a capitation tax, which, although the revolutionary battles had been mainly fought and won by them, was still continued till they were freed by Castilla. In 1859 and 1860 the port of Guayaquil was blockaded by a Peruvian force, and in the latter year Castilla landed troops and proclaimed Franco, a minion of his own, president of Ecuador; but the new ruler, having no means of enforcing his authority except those supplied by his ally, was shortly afterward obliged to leave the country. All efforts to overthrow Castilla's government having failed, an attempt was made to assassinate him while riding in the streets of Lima in Aug. 1860. Three months afterward a better planned attempt was made by the conspirators, and a company of soldiers led by their officers succeeded in entering his house early in the morning. Castilla, being aroused by his wife, managed to escape in his shirt to the street, when the soldiers who had been brought to assassinate him turned, by the order of a friend of Castilla, and shot their officers on the spot.

PERUGIA, a province of the kingdom of Italy, formerly of the Papal States, bounded N. by the provinces of Urbino e Pesaro, E. by Macerata and Camerino, S. by Spoleto, and W. by Orvieto and Tuscany; area, 1,447 sq. m.; pop. in 1853, 234,536. The entire surface of the province is covered with spurs of the Apennines, the main chain of which runs along the N. and E. frontiers. The Tiber flows through the middle of the province. Although the face of the country is generally hilly, there are many wide and fruitful plains, so that Perugia is considered one of the most fertile provinces of the Apennines. The chief cities are Perugia, Assisi, and Nocera. The lake of Perugia (anc. *Thrasymenus*) is in the W. part of the province, near the Tuscan border, 9 m. W. of the city of Perugia. Its height above the sea is 1,107 feet, its length 9 m., its breadth 7½ m., and its depth not over 30 feet. It contains the three islands of Polvese, Maggiore, and Minore. Near Passignano, on the N. E. side of the lake, is supposed to be the place of the battle fought in 217 B. C. between Hannibal and the Romans.—Perugia, the chief town of the province (pop. 18,301), is situated on a high hill, 984 feet above the sea, on the left bank of the Tiber. It is enclosed by walls in the form of a polygon. Of the churches, said to be over 100, the most important are the Duomo or cathedral, the church of San Francesco, and the church of San Domenico. Among the other public buildings worthy of mention are the town house, the old exchange, and the citadel, built by Pope Paul III. Perugia is a bishop's see, and has a university founded in 1320, with a library of 30,000 volumes, a botanic garden, a mineralogical collection, and a cabinet of antiquities. The manufactures, which are few, consist principally of soap, distilleries of brandy and liqueurs, silks, and woollens. Perugia (anc. *Perusia*) is not mentioned in history until 310 B. C., when it is spoken of as one of the most powerful cities of Etruria. It was engaged in several wars with Rome, but was ultimately obliged to succumb to its power. In 41 B. C. it became conspicuous in the civil war between Octavius and L. Antonius, the latter throwing himself into the city and sustaining a desperate siege. He was forced to capitulate, and Perugia was burned down, having been accidentally set on fire. It soon became again a flourishing city, was a place of much importance in the Gothic wars, subsequently became a free municipal town, suffered greatly from the contests of the Guelphs and Ghibellines, and finally of its own accord placed itself in the hands of Braccio da Montone. Pope Paul III. included it in the Papal States. In 1859 its revolted inhabitants were treated with exceeding severity by the papal troops, and in 1860 it was annexed to the possessions of Victor Emanuel.

PERUGINO, Pietro, an Italian painter, whose true name was Vannucci, the master of Raphael, born in Castello della Pieve, in the ancient district of Umbria, in 1446, died there in 1524. He received his first instructions in painting from artists of the Umbrian school, and at the age of 25 visited Florence, where he studied with great assiduity, and became the friend and fellow pupil of Leonardo da Vinci. Having painted here a number of works, including an altarpiece of the Assumption, now in the academy of fine arts in Florence, he returned about 1475 to Umbria, and established himself in Perugia, whence he acquired the name Perugino, by which he is commonly known. In 1480 he was invited by

Sixtus IV. to Rome to assist in decorating the Sistine chapel, and the frescoes executed by him there show that his style was then essentially Florentine. After his return to Perugia he resumed the feeling and manner acquired from his early Umbrian teachers, modifying their asceticism by an infusion of grace, and greatly improving in drawing and coloring. His frescoes in the exchange of Perugia are considered his principal work. Other pictures painted there "are remarkable," says Mrs. Jameson, "for the simplicity, grace, and dignity of his Virgins, the infantine sweetness of the children and cherubs, and the earnest, ardent expression in the heads of the saints." He was now one of the most popular painters of Italy, and undertook numerous works, many of which were executed by his scholars from his designs. Gradually he was induced by avarice to sacrifice his art to love of gain, and his pictures painted subsequent to 1505 are feeble, mannered, and monotonous, beside showing marks of careless and rapid execution. His reputation could not long hold out against this deterioration of style, and during the last 10 or 15 years of his life he may be said to have survived himself. His best period was between 1490 and 1505. His school was then numerous and celebrated, and among his pupils and assistants he numbered Raphael, who remained with him from 1495 to 1502. Perugino's works are found in every considerable collection in Europe, but those painted in his best manner are rare.

PERUVIAN BARK. See Cinchona.

PERUZZI, Baldassare da Siena, an Italian architect of the Siennese school, born in Volterra in 1481, died in Rome in 1536. The early part of his life was devoted to painting, and after executing some works in a chapel at Volterra, he went to Rome, where he painted some frescoes in the church of S. Onofrio, in that of San Rocco à Ripa, and in the fortress of Ostia. Subsequently he began the study of architecture, and became especially distinguished for his skill in architectural perspectives and scene painting. One of the best of his works was the Farnesina palace, so elegantly constructed that, according to Vasari, it "ought rather to be described as a thing born than as one merely built;" and so exquisitely adorned that when Titian first saw it, he could hardly be persuaded that the objects were not real. Peruzzi erected and embellished a large number of buildings and façades. In 1520 Leo X. appointed him to succeed Raphael as the architect of St. Peter's; but on the sacking of Rome in 1527 by the constable de Bourbon, Peruzzi was stripped of all his property, and it was with extreme difficulty that he escaped with his life to Sienna. Returning to Rome, he began the erection of the Palazzo Massimi, usually considered his masterpiece, but did not live to see it completed. His whole life was a series of misfortunes. He was poisoned by a rival architect from jealousy, and died in indigent circumstances. He was buried in the Pantheon near Raphael. He has been called the Raphael of architecture.

PESARO (anc. *Pisaurum*), a city of central Italy, capital of a district of the same name, in the legation of Urbino e Pesaro, and situated at the mouth of the Foglia, 19 m. N. E. from Urbino; pop. 18,000. It is fortified, adorned with magnificent churches, palaces, and other buildings, and has a public library, 2 hospitals, a foundling asylum, and a theatre. Several of the churches and convents contain valuable paintings. Delf, glass, and silk are manufactured. The figs which grow in the neighborhood are considered the best in Italy.—The city is first mentioned in history in 186 B. C., when a Roman colony was settled there. It was a flourishing town during the empire, was destroyed by Vitiges in the Gothic wars, was rebuilt in part by Belisarius, became prosperous under the exarchate of Ravenna, and was one of the cities of the Pentapolis.

PESCE, Nicola, or Cola, a Sicilian swimmer and diver, who lived about the end of the 14th century. He received the name of Pesce (the Fish) from his skill in diving and swimming, and was patronized and employed by Frederic, king of Sicily. Having been accustomed from his boyhood to dive for oysters and corals, he became so expert as to be enabled to remain under water longer than any other person on record, and the most fabulous stories were told of his feats. It was said that he was in the habit of passing whole hours under water and whole days in it, and of swimming from Sicily to the Lipari islands, carrying a leather bag containing letters and despatches. The story goes that Frederic wished him to dive off Point Faro, into the whirlpool of Charybdis; and as Pesce doubted whether to make the attempt, the king threw into the sea a golden cup. Pesce dived after it, and, after staying a long time under water, succeeded in recovering the cup, which he received as a gift along with a purse of gold. A second experiment, however, resulted in his death. Schiller's ballad of "The Diver" is founded upon this incident.

PESHAWER, or Peshawur, a province of British India, in the Punjaub territory, occupying the N. W. extremity of the Indian empire, bounded N. by the territory of Cashmere, E., S. E., and S. by Lahore, and W. and N. W. by the Afghan province of Jelalabad; area, 2,324 sq. m.; pop. about 500,000. The Khyber, Mohmund, Swat, and Khuttuk mountains form the boundary line on all sides except the E. and S. E., upon which the Indus flows. The province is exceedingly well watered by several streams, and the water is applied to purposes of irrigation by means of canals from which it is raised by Persian wheels turned by cattle, and by other contrivances worked by men. The climate is very hot in summer. The soil is naturally fertile; vegetation continues throughout the year, and two harvests are gathered. The principal crops raised are wheat, barley, maize, millet, ginger, turmeric, tobacco, and cotton, together with the greater part of the fruits and vegetables grown in both tropical and temperate regions, and a kind of rice called *bara*, the finest in the world. The road from Hindostan to Cabool and Khorassan by the Khyber pass leads through Peshawer; and the province being open to the inroads of the wild inhabitants of the mountains, the British maintain a regular military force of upward of 10,000 men along the grand trunk road between Lahore and Peshawer to hold them in check.—The capital, PESHAWER, is situated on the river Bara, in lat. 33° 59′ N., long. 71° 40′ E., about 18 m. E. from the E. extremity of the Khyber pass; pop. 53,295. It is surrounded by high mud walls, strengthened with bastions, and defended by a fort. When Peshawer was ruled by the Afghans, it contained 100,000 inhabitants; but after their defeat by Runjeet Singh he destroyed the fine houses of the chief citizens, desecrated the mosques, and laid the surrounding country waste. The exactions of the Sikhs were subsequently so heavy that its restoration was prevented, but since its occupation by the British all restrictions upon it have been removed, and the town has rapidly increased. About ¾ of the inhabitants are Mohammedans, and the remainder Hindoos. Peshawer was founded by the emperor Akbar. The present fortress was erected by Runjeet Singh.

PESTALOZZI, JOHANN HEINRICH, a Swiss teacher, and founder of the Pestalozzian system of education, born in Zürich, Jan. 12, 1746, died in Brugg, Feb. 17, 1827. His father was a physician of Zürich, his mother the daughter of a Protestant clergyman. By the death of his father when Heinrich was only 6 years of age, he was thrown entirely under his mother's care. Naturally of a feeble constitution, no effort was made to develop and invigorate his physical system; and he grew up awkward and clumsy. His temperament was highly visionary and speculative, and he was constantly distressed with an ambition to do something for the benefit of his country, and especially of the poor, while he possessed little executive ability and still less practical knowledge. His disposition was amiable, affectionate, and patriotic. His education was meagre, especially in the common branches (for he was tolerably familiar with the classics), when Rousseau's *Émile* fell into his hands, and led him to abandon the legal and historical studies which he had commenced, and set up for an educational reformer. By the advice of Tschiffeli, an intelligent but enthusiastic and impracticable farmer of Kirchberg, in the canton of Bern, he purchased a barren tract of land near Birr, and in 1767, in connection with a rich mercantile firm in Zürich, commenced a madder plantation, and erected a villa for himself, which he named Neuhof. Here he purposed to establish a centre for his educational and agricultural labors; but the madder plantation did not prosper; the villa was too costly for the estate; his assistants were unfaithful; and he himself was entirely incompetent for a business undertaking of such magnitude. The result was, that his Zürich partners withdrew their capital; but Pestalozzi resolved to continue his farming, and to combine with it a school for poor children. The school was opened in 1775, and soon had 50 pupils. His plan was to make it a manual labor school, employing the children in summer in field work, in winter in spinning and other handicrafts. Instruction was to alternate with labor in the summer, and in the winter the teaching, which was chiefly oral, was to be communicated while they were at work. The school did not succeed, partly because Pestalozzi was too good-natured to resist the importunity of the parents in demanding a compensation for the children's work far beyond its value; but mainly because he attempted to carry on the higher branches of manufacture, when the children whom he employed had not acquired sufficient skill to produce well even the commonest goods. In 1780 he was compelled to break up the school. He was at this time reduced to great extremities. His wife, who had pledged nearly her whole property for him, was suffering from a protracted illness, and they were often without money, bread, or fuel. It was under these depressing circumstances that his genius, ripened by suffering, began to display itself. Near the close of the year 1780 there appeared a paper from his pen in Iselin's *Ephemeriden*, entitled "The Evening Hour of a Hermit." It contained a series of aphorisms on education, and produced a decided effect in Germany and Switzerland. In 1781 appeared the first part of his *Lienhard und Gertrud*, a work which at once established his reputation as a writer, and the object of which was to enforce the importance of home education, and the evils of dissipation. It had a large sale, and excited much attention in Germany and Switzerland. It has been translated into most of the languages of Europe. The agricultural society of Bern awarded Pestalozzi their great gold medal and a vote of thanks. Offers were made him to remove to Italian Switzerland, to Austria, where Count Zinzendorf desired his aid, and to Florence, where the grand duke of Tuscany was about to give him an appointment; but, depressed in spirit, he preferred to remain at Neuhof, where his circumstances were not much improved. In 1782 he published *Christoph und Else*, a supplement to his "Leonard and Gertrude," but far less popular. Several other of his works of a philosophical character were published between this period and 1798. He also edited during a part of this time "The Swiss People's Journal," and projected a lunatic asylum and a reformatory institution, but neither went into operation. In 1792 he visited Germany, and formed the acquaintance of Goethe, Herder, Wieland, Klopstock, and Jacobi. In 1797 and 1798 the impending danger to his country from the French occupation roused his patriotic spirit, and he urged upon the people, in his "Journal," as well as in other publications, the importance of order, justice, and law, the promotion of education, and a return to the integrity and piety of their ancestors. The government offered him an office to quiet him, but he replied to their inquiry as to what office he would be willing to accept: "I will be a schoolmaster." He was accordingly about to open an educational institution in the canton of Aargau, when, in Sept. 1798, Stanz in Unterwalden was burned by the French, the entire canton laid waste, and a multitude of orphan children left homeless. Legrand, then at the head of the Swiss directory, called upon Pestalozzi to go to Stanz and take care of those destitute children. Here for 10 months he taught, fed, and trained 80 children, under the most difficult and distressing circumstances, a considerable number of them sick, and all suffering from scurvy and cutaneous affections. He would probably have died under his labors, had not the French, in their retreat, visited Stanz again, and turned the convent where Pestalozzi was teaching into a hospital. After a few months he obtained permission to teach in a primary school at Burgdorf, in the canton of Bern. A year later an attack of pulmonary disease compelled him to relinquish his labors, and in 1800, in conjunction with Krüsi, Tobler, and Buss, he opened an educational institution at Burgdorf. This school may be regarded as the first systematic attempt, on the part of Pestalozzi, to reduce to practice the principles of education shadowed forth in his "Leonard and Gertrude" nearly 20 years before; and it is remarkable that he should have attained his 54th year before putting in practice a system which had been fully formed in his mind for 20 years. It was the next year after the organization of this school that he gave to the world a full exposition of his educational views, in a work bearing the singular and hardly appropriate title of *Wie Gertrud ihre Kinder lehrt* ("How Gertrude teaches her Children"). This work had a wide circulation, and attracted not only private friends of education, but deputations from several of the European governments, to visit the institution at Burgdorf. In 1804 another revolution occurred in the government, and the castle at Burgdorf which Pestalozzi had hitherto occupied being wanted by the Bernese government, he was under the necessity of removing his school to Buchsee, where the government assigned him a monastery, close by Hofwyl, the estate of Fellenberg, who soon came to have a controlling interest in the management of the school. It was not long, however, before Pestalozzi found the methods of management introduced by Fellenberg so different from his own, that he accepted a proposal in 1805 to remove his institution to Yverdun. At first only a few of his teachers and pupils accompanied him, but half a year later the rest came. Here, though now in his 60th year, Pestalozzi entered upon the work of teaching with greater zeal than ever before, and with more decisive results. His system, as developed in his "How Gertrude teaches her Children," and his "Book for Mothers," which followed it, was gaining popularity in most of the countries of Europe; teachers were sent to him for instruction, and the Pestalozzian system was formally adopted by the Prussian and other German governments, while it greatly modified the method of Sagan in Austria, that of Jacotot in France, and that of Father Girard in Belgium. But dissensions soon sprang up among his teachers. Schmid, indispensable to Pestalozzi for his financial skill and executive ability, was haughty, stern, and overbearing in his manners toward the other teachers, and in 1810 an *émeute* occurred, which was only quieted by his leaving the institution. There was no one left who could fill his place; Pestalozzi himself had no skill in financial management or discipline, and in 1814 the downward tendency of the institution necessitated Schmid's return. In 1816, 12 of the teachers, unable to remain with Schmid, resigned at once; among them were Krüsi, Niederer, Blochmann, and Buss. This was followed by a 7 years' lawsuit, arising out of the pecuniary affairs of the institution, between Pestalozzi and Schmid on the one side and Niederer on the other. It was finally settled by arbitration. Meantime the school was losing ground; a poor school at Clindy, intended as a sort of appendage to the institution at Yverdun, was maintained for 5 years, but was finally relinquished. At length, in 1825, the Yverdun institution was broken up, and Pestalozzi, now in his 80th year, retired to the home of his grandson at Neuhof, where, 50 years before, he had commenced his first school for the poor. In 1818 a portion of his works had been collected by Schmid, and published by subscription, which yielded him a net return of about $10,000. After his retirement to Neuhof, with a mind still unbroken by adversity, he wrote his *Schwanengesang* ("Song of the Dying Swan") and *Mein Lebensschicksale als Vorsteher meiner Erziehungs-Institute in Burgdorf und Iferten* ("Fortunes of my Life, as Principal of my Educational Institutions at Burgdorf and Yverdun"), and delivered two or three lectures on education.—It is difficult for the reader, unfamiliar with the history of education, to understand how this man, whose whole life, considered in detail, seems to have been a succession of failures, should have exerted an influence so powerful as he evidently has upon the civilized world for the last 50 years; but the true explanation is, that in his educational theories he had brought to light great and abiding principles, and that his system was greatly better than his own exemplification of it. The principles developed in his works on education, though some of them perceived but dimly by himself, are the following: that education should proceed according to the laws of nature; that it is the duty of the teacher to assist this, by exciting the child to self-activity, and rendering him only a limited degree of assistance; that progress should be slow and gradual, but uninterrupted, never passing to a second topic till the first is fully understood; that the memory and the understanding should not be unduly cultivated, but all the faculties developed in harmony; that the peculiarities of every child and of each sex should be carefully studied in order to adapt instruction to them; that the elements of all knowledge are form, number, and language, and that these elements should be taught with simplicity and thoroughness; that the art of observing should be acquired, and the perceptive faculties well developed; that every topic of instruction should become an exercise for the reflective powers; that mental arithmetic, geometry, and the arts of drawing and modelling are highly important exercises for training, strengthening, and disciplining the mind and the faculties; that the laws of language should be developed from within, and the exercises in it made not only to cultivate the intellect but to improve the affections; that vocal music should be taught in schools, not by rote, but by a careful study of the elementary principles of music; that the proper method of instruction is not by question and answer, but, in the early stages of education, by dictation by the teacher and repetition by the scholar, and at a more advanced stage giving out problems by the teacher, to be solved by the pupil without assistance; that religious instruction should begin with the mother, that the filial feelings of the child should be first cultivated and directed toward God, and that formal religious instruction should be reserved to a later period, when the child can understand it; that despotic and cruel government in schools (which had been almost universally practised up to his time) is improper, but that artificial incentives to emulation are equally so; that the consciousness of increased intellectual vigor, and affectionate regard for the teacher, are the best stimulants to exertion; and finally, that the careful culture of the physical powers and the exercise of the senses are of very great importance to the complete development of the child. It was the office of Pestalozzi to educate ideas and not children; to combat the errors, prejudices, and abuses which were prevalent on the subject of education in the age in which he lived; to lay down correct principles, which others could carry out much better than he, and which have effected a complete revolution in the education of the young. —A list of Pestalozzi's works, collected by K. von Raumer, enumerates 40 distinct volumes, of which about 30 are devoted to educational topics; the remainder are philosophical or political. For an analysis of most of these, and extracts from several of them, see "Pestalozzi and Pestalozzianism," edited by H. Barnard, LL.D. (New York, 1859).

PESTH (Hung. *Pest*), the commercial and literary metropolis of Hungary, and capital of the central county of the same name, situated on the left bank of the Danube, opposite Buda, 135 m. E. S. E. by railway from Vienna; pop. about 95,000. Together with Buda it is also known under the name of Buda-Pesth (Hung. *Budapest*), both cities together constituting the administrative, and, according to the laws of 1848, also the legislative capital of the country. They are connected by a suspension bridge, one of the greatest works of the kind, commenced in 1840 under the direction of the English engineer Tierney Clark, and opened Jan. 5, 1849, being first crossed by the retreating Hungarian revolutionary army under Görgey, and immediately after by the Austrian army under Windischgrätz, both accompanied by heavy trains of artillery and ammunition. The towers of the bridge are 200 feet in height; the length of the central span is 670 feet, the entire water way 1,250, the width of the roadway 25, and of each footpath 6, the height of the platform above the river 45, and of the towers above the same level 120. The view from the bridge over the river and its banks, one of which, that of Pesth, is lined with a magnificent row of massive palatial buildings, and the other crowned by the high fortress of Buda and the surrounding mountains, is unsurpassed in beauty. But it is to the river and its islands, and principally to the picturesque environs of Buda, that the capital of Hungary owes almost all its natural attractions, Pesth being built on a sandy plain, destitute of any interesting feature. The town consists of 5 divisions, called the Inner, Leopold, Theresa, Joseph, and Francis towns. Of these the Inner town is the oldest or original part of the city, forming a quadrangle on the bank of the Danube facing the S. part of Buda and the Blocksberg (Gellért mountain). It is surrounded by the other divisions in a kind of semicircle, commencing with the Leopold town on the upper or northern bank of the Danube, and in the Francis town returning to the lower or southern. The Inner town and Leopold town contain the principal and most fashionable parts of the metropolis, among others the long and grand quay along the water side, above and below the bridge, with its row of high, massive, and brilliantly whitewashed buildings, some of them adorned with porticoes; the New, Joseph's, City Hall, and other principal squares, of which the former is one of the largest in Europe; the fashionable and commercial thoroughfares, the Waitzner (Hung. *Váczi*), Gentlemen's, and Bridge streets; the Dorothea, Wind, and other wide streets adorned with splendid private residences; the Parisian alley, a *passage* in the style of those of the French capital; the city hall, the county house, and other administrative public buildings; the city theatre, the national casino, the exchange, and the principal newspaper offices; and the largest hotels, some of which rival in elegance the finest establishments of their kind in continental Europe. The coffee houses of Pesth, most of which are attached to hotels, are especially commodious. Beside the above mentioned streets, the Waitzner road, Country road, Kecskemét road, and King's street are among the main thoroughfares of Pesth. Most of these, as well as other new streets, being wide and straight, the city is frequently annoyed by drifts of dust from the sandy environs, against which it is protected, however, on the N. E. by an extensive plantation, called the city grove, and forming the most frequented promenade. It is well paved, and lighted with gas.—Pesth contains some of the highest administrative or judicial courts of the country, among others the so called septemviral table, or supreme court of appeals, the royal table, and the central police office; the highest institutions of learning, the foremost of which is the university, one of the most richly endowed in the world, with a library of more than 70,000 vols., a botanic garden, a museum, an observatory, and a printing establishment (the last two in Buda); the national museum, which owes its origin chiefly to the munificence of Count Francis Széchényi and other Hungarian magnates, and contains rich collections of antiquities, coins and medals, works of art and literature, and natural and historical curiosities; a national theatre, which by the talents of its performers vies with the best stages of Vienna; the Hungarian academy or scientific society, founded by the diet in 1825, the principal object of which is the cultivation and scientific development of the Hungarian language; and numerous other national or private patriotic associations for the promotion of literature, art, commerce, or industry. There are large civil and military hospitals, poor and orphan houses, insane and blind asylums, a house of invalids, a workhouse, a *mont de piété*, a pension house for ex-officials, and numerous other benevolent institutions, some of which belong only to particular denominations. Of the schools, too, some are sectarian in their character, or belong only to a certain nationality, there being schools for Magyars, Greeks, Wallachs, Germans, Illyrians, Jews, &c., as well as common schools. One of the most renowned civil schools is the Piarist gymnasium. The principal military institution is the Ludoviceum. The largest military building is the "New Building," a barrack and artillery depot of enormous dimensions, built by Joseph II. for some unexplained purpose, and frequently used as a state prison, from which after the revolution of 1848–'9 some of the most distinguished Hungarian patriots were taken to the scaffold. The churches of Pesth are comparatively neither numerous nor conspicuous; those of the Roman Catholics exceed in number those of all other denominations together, the Catholics forming about $\frac{3}{4}$ of the population, the Jews $\frac{1}{8}$, the Protestants $\frac{1}{15}$, and the Greeks $\frac{1}{100}$. The German and Hungarian languages are chiefly spoken, and beside these the Slovakian, Servian, and other Slavic dialects.—The principal occupations of the inhabitants are commercial, trade being promoted by railways connecting the metropolis with the most flourishing parts of Hungary, as well as with the German provinces of Austria, by the active steam navigation on the Danube, which makes it one of the most important depots of commercial exchange between Constantinople and the West, and by four annual fairs, during which the city and its suburbs are filled for weeks with traders of various nationalities, Magyars, Germans, Jews, Slovaks, Poles, Ruthenians, Wallachs, Serbs, Greeks, Armenians, Croats, Transylvanian Saxons, and others, exchanging the produce or manufactures of their respective provinces, or of foreign countries. One of the most active branches of industry is the printing business, the publishing establishments of Pesth supplying Hungary with the most important productions of national Hungarian literature, with numerous works in German, Servian, Wallachian, Slovakian, Ruthenian, &c., and with numerous journals and periodicals. Of the daily newspapers published in 1861 the *Pesti napló* ("Pesth Diary"), *Magyarország* ("Hungary"), and the *Lloyd* (in German) are among the most conspicuous.—The origin of Pesth is ancient. The Romans had a colony on its site, called Transacincum. It is mentioned as a town in the history of the 11th century, and was destroyed by the Mongols in 1241, but having been rebuilt became flourishing at a later period, when Buda was made the capital of the kingdom. The diets and elections of kings were then held on the plain of Rákos, at a short distance from the town, in the open air, nobles, magnates, and priests assembling in arms, and dwelling under tents. After the battle of Mohács (1526), Pesth was for about 160 years in the hands of the Turks, until the conquest of Buda (1686) put an end to their sway in Hungary. At the beginning of the 18th century it was made a royal free city, and from that time its growth was continuous down to the national war of 1848–'9, interrupted only for a short time by a frightful inundation in March, 1838. Its great revolutionary day was March 15, 1848. The Hungarian national assembly was opened there July 5. The city was evacuated by the revolutionary government and army at the beginning of 1849, reoccupied by the troops under Aulich in April, and repeatedly bombarded by Hentzi during the siege of Buda in May, on which occasion about 60,000 of the inhabitants found refuge in the city grove, living there under tents. The Hungarian independent government established itself there and in Buda in June, but abandoned it in July. After the surrender of Comorn it witnessed the execution of Count L. Batthyányi (Oct. 6), of Csányi, Perényi, Jeszenák, and other distinguished patriots. At that time thousands of its inhabitants withdrew to the rural districts, and it was for a time comparatively deserted.

After the disasters of the Austrians in Italy, however, it again became the centre of national agitation, culminating in the assemblies of the county board, the commune, and the "national club," in Feb. and March, 1861.

PETAL, in botany, an organ of the flower which helps to compose the corolla. In every developed blossom are found two rows of leaves, the outer, generally green, called the calyx, the inner, usually colored and sometimes white, called the corolla. When both calyx and corolla are of the same substance and color, the rows of leaves are called the perianth, a term belonging properly to the liliaceous plants. Petals vary greatly in size, from very minute points to broad and expanded laminæ; they may be entirely free and fall separately, or be more or less united at their edges, forming what is called the monopetalous corolla. The office of the petals seems to be to guard the more essential parts from harm until after impregnation; they constitute the beauty of the plant, their tints being of all grades from delicate to magnificent.

PETARD, in artillery, a very short gun, formerly used for blowing down gates and other barricades. It was mounted upon a plank and secured close to the object to be burst open. Its length was only about 7 inches, and its bore at the mouth 5 inches. Its charge was from 9 to 20 lbs. of gunpowder. Petards are said to have been first used by the French Huguenots at the siege of Cahors in 1579. Various curious devices were employed as a protection against them, one of which, figured in Hanzelet's *Traités militaires* (1598), was a sort of trap in which the machine and those applying it were caught. Loose bags of powder exploded against gates are found to be equally effectual as petards.

PETCHORA, a river of European Russia, which rises in the western slopes of the Ural mountains, about lat. 61° 40′ N., long. 59° E., and flows into the Arctic ocean by many mouths in lat. 68° 20′ N., between long. 53° and 54° E., after a course of 900 m. After leaving the government of Perm, in which it rises, it passes through those of Vologda and Archangel by a very circuitous course, and many islands are formed by the stream separating and again uniting as it approaches the sea. Its principal tributaries are the Ussa, Ishma, and Tsylma.

PETEN, Lake of. See Guatemala.

PETER, Saint, one of the 12 apostles, born at Bethsaida in Galilee. He was a son of one Jonas or John, whence Christ calls him on one occasion (Matt. xvi. 17) by the surname Barjona, or son of Jonah. His original name was Simon. Before his vocation to the apostleship he had married and removed to Capernaum on the lake of Gennesareth, where with his brother Andrew he followed the occupation of a fisherman. It is probable that like Andrew he was a disciple of John the Baptist. It is related by St. John the Evangelist that the Baptist, standing with two of his disciples, saw Jesus pass by, and exclaimed: "Behold the Lamb of God!" whereupon the disciples followed our Lord and remained with him all that day. One of these two was Andrew, who had no sooner discovered that Jesus was the Messiah than he sought out his brother and brought him to our Lord. "And when Jesus beheld him, he said, Thou art Simon the son of Jona; thou shalt be called Cephas, which is by interpretation a stone." (John i. 42.) It is from the Greek word πέτρος, the equivalent of Cephas, that the apostle derived the name of Peter—a name which on a subsequent occasion Christ expressly gave to him, declaring: "Thou art Peter, and upon this rock I will build my church." (Matt. xvi. 18.) After their first intercourse with the Saviour Peter and Andrew returned for a season to their occupation of fishing, and were engaged in washing their nets when Jesus, shortly after the commencement of his ministry, walking by the sea of Galilee, entered into Peter's boat to avoid the pressure of the multitude. Peter had toiled all the night and had taken nothing; but at Christ's command he let down the net again and enclosed a miraculous draught of fishes, so that the net broke with the weight. He now received his call to leave all and become "a fisher of men," being with his brother Andrew the first chosen of the apostles. He seems beside to have been one of the most favored of the 12; he was one of the 3 who were selected to witness the transfiguration and to watch with the Saviour during the agony in the garden of Gethsemane. He frequently appears in the Gospels as the spokesman for his companions; he is often specially addressed by our Lord, and it is probable that Christ dwelt at his house in Capernaum. It is the opinion in fact of most, though not of all critics, that he enjoyed a certain preëminence among the apostles, upon which, coupled with the injunction given to him by the Saviour to feed his flock, and the declaration: "Thou art Peter, and upon this rock I will build my church," the Roman Catholics found the doctrine of the supremacy of the popes as Peter's successors. Protestant theologians however regard this preëminence as personal and not official, and conferring honor without any superior authority. The character of Peter, as displayed in the gospel narratives, is one that commends itself particularly to our interest and affection. Ardent, zealous, quick in his faith, and strong in attachment to his divine Master, he yet exhibits in a more marked degree than his fellow apostles the common failings of humanity. When Christ walked upon the sea of Galilee to meet his disciples whose ship was tossed with the waves, Peter with his leave walked toward him upon the water; but becoming afraid he began to sink, and cried: "Lord, save me." Jesus stretched out his hand and caught him, and rebuked his fears, saying: "O thou of little faith, wherefore didst thou doubt!" (Matt. xiv. 29–31.) Again, when Christ predicted his passion and death, Peter remonstrated with him, exclaiming: "Be it far from thee, Lord; this shall not be unto thee. But he turned and said unto Peter, Get thee behind me, Satan; thou art an offence unto me; for thou savorest not the things that be of God, but those that be of men." (Matt. xvi. 22, 23.) At the last supper during the feast of the passover, when our Lord washed his disciples' feet, Peter at first refused with great vehemence to permit his Master so to humiliate himself before him; but being told by him: "If I wash thee not, thou hast no part with me," he cried out: "Lord, not my feet only, but also my hands and my head." The same night, in reply to a boast of the apostle that he would lay down his life for his Master, Jesus said to him: "The cock shall not crow until thou hast denied me thrice." (John xiii.) The fulfilment of this prophecy, and the apostle's grief for his fall, as well as his rash zeal in the garden of Gethsemane, when he smote off the ear of one of those who came to apprehend Christ, are familiar events in the history of the passion. Peter was one of the first to whom the Lord showed himself after his resurrection. On a subsequent occasion he had been fishing all night with Thomas, John, James, Nathanael, and two others, and had caught nothing, when Jesus appearing on the shore bade them cast their nets on the right side of the ship, and it enclosed such a multitude of fishes that they could not draw it up. As soon as Peter knew it was the Lord, he threw himself into the sea in his impatience to come to him. Thrice assuring Christ, in answer to his questions, that he loved him more than the rest, he was commanded to feed his Master's sheep and lambs, and was then foretold the sufferings and death whereby he should glorify God, when he should stretch forth his hands, and another should gird him, and carry him whither he would not. (John xxi.) From this time his character seems to have been changed by an infusion of that strength and dignity which it previously lacked. He is frequently mentioned in the Acts, and always appears as a bold and unflinching preacher of the new faith. He preached to the multitude in Jerusalem on the day of Pentecost with such effect that 3,000 persons were converted and baptized. With John he cured a lame man at the gate of the temple, and was brought before the sanhedrim and commanded to speak no more in the name of Jesus; but he courageously refused to obey this injunction. At his rebukes Ananias and his wife Sapphira, who had sold their goods and laid part of the price at the apostles' feet, pretending that it was the whole, were struck dead. After Philip had converted a great number in Samaria, Peter and John went down to them, and laid their hands on them that they might receive the Holy Ghost. (Acts viii. 14, 17.) Peter then returned to Jerusalem, preaching on the way in many Samaritan villages, and afterward went to Lydda, where he cured Æneas of the palsy. At Joppa he raised to life a Christian woman named Tabitha or Dorcas. While lodging here with one Simon, a tanner, he was taught by a vision that the gospel should be preached not only to the chosen people, but also to the gentiles, and instructed to accompany 3 men who had been sent to him by Cornelius, a centurion who dwelt at Cæsarea. Having baptized this man and his household, he returned to Jerusalem, where some of the brethren rebuked him for holding intercourse with the uncircumcised; but on hearing of his vision they held their peace and glorified God. Imprisoned by Herod (A. D. 44), he was released by an angel and went to Cæsarea. He next appears at a council of the apostles and elders at Jerusalem (A. D. 51), when he advocated the exemption of gentile converts from the ceremonial obligations of the Mosaic law; but St. Paul relates that he "withstood Peter to his face," because, after living freely with the gentiles at Antioch, he withdrew from them through fear of giving offence to the converted Jews. (Gal. ii. 11–14.) The remainder of his history rests upon tradition. Jerome, Origen, Eusebius, Chrysostom, and others relate that he became bishop of Antioch, where he passed several years. He appears also to have preached in Pontus, Galatia, Bithynia, Cappadocia, and the province of Asia. According to Eusebius, Jerome, and others, he was for the last 25 years of his life bishop of Rome; but if this is true, which many Protestant critics doubt, he did not remain all the time in that city. His first visit is supposed to have been made about A. D. 40, or 4 years before his imprisonment by Herod at Jerusalem. Returning to Rome after his release, he is said to have been banished by the emperor Claudius in 49, but he was soon permitted to reënter the metropolis, and suffered martyrdom there in the reign of Nero.—St. Peter is the author of two canonical epistles, the first of which, dated from Babylon, whereby some suppose is meant Rome, was probably written between 45 and 55. It is addressed chiefly to the converted Jews, and its purpose was to confirm them in their faith under persecution and to confute the errors of Simon and the Nicolaitans. The second epistle is likewise addressed to the Jews, and is supposed to have been written shortly before the apostle's death. Its authenticity has often been doubted, but that of the first epistle is generally unquestioned. They are both glowing and rapid in style, and as literary productions have elicited the warmest admiration.

PETER I. ALEXEIEVITCH, czar of Russia, known as Peter the Great, born in Moscow, June 10, 1672, died in St. Petersburg, Feb. 8, 1725. His father Alexei died in 1676, and was succeeded by Feodor, the heir apparent. Feodor died in 1682 without issue, naming Peter as his successor, to the exclusion of Ivan, the next heir, an imbecile youth. An insurrection followed, fomented by their sister Sophia, a young woman of great ambition and some talents. The difference was settled after much bloodshed by the joint coronation of Ivan and Peter (May, 1682), with Sophia as regent. For 7 years, she held the reins of government. Peter, when 17 years of age, married the daughter of one of his nobles, the boyar Feodor Abrahamovitch, contrary to the regent's wishes, and soon afterward emerged from the life of retirement and idleness to which Sophia's ambition had consigned him, and, assisted principally by two foreigners, the Swiss Lefort and the Scotchman Gordon, assumed the direction of affairs. He shut up his intriguing sister in a convent, where she ended her life in 1704, and sent her minister, Prince Gallitzin, into banishment. Ivan voluntarily withdrew, leaving Peter in effect sole sovereign, and died in 1696. Peter came upon the stage of action with a neglected education, an impetuous temper, and sensual habits. He at once began numerous reforms. He organized a new army, entering the ranks himself, and rising through every grade; and this example he required his nobles to follow. Finding Russia without ships, he laid the foundation of a navy by employing Dutch and Venetian shipwrights to build several small vessels on Lake Peipus. He learned practical seamanship by cruising on board Dutch and English ships at Archangel, the only seaport Russia then had, and sent young Russians to Venice, Leghorn, and Holland for the same purpose. Looking to a maritime policy, he besieged and took the Turkish city of Azof near the Black sea (1696), and in the same year divorced his wife on account of her opposing his plans. In order to improve his semi-barbarous subjects, he fostered communication with the western nations of Europe, at whose courts Russia was not then represented; and, sensible of his own deficiencies, he left his dominions for a temporary residence abroad (1697). This journey is an epoch in the history of his empire. He went first with a few attendants to live at Saardam, a famous ship building village of Holland, where, in disguise as a Dutch skipper, Pieter Timmerman by name, he led the life of a common shipwright. "He rose early, boiled his own pot, and received wages for his labor." He was then described as being "very tall and robust, quick and nimble of foot, rapid in all his actions, his face plump and round, fierce in his look, having brown eyebrows and curling brown hair, and swinging his arms in walking." To practical ship building and kindred trades he added various studies, as natural philosophy, astronomy, and geography, and attended the anatomical lectures of Ruysch at Amsterdam. From Holland he went to London (Jan. 1698), and took up his residence in Norfolk street. Here, says Macaulay: "His stately form, his intellectual forehead, his piercing black eyes, his Tartar nose and mouth, his gracious smile, his frown black with all the stormy rage and hate of a barbarian tyrant, and, above all, a strange nervous convulsion which sometimes transformed his countenance, during a few moments, into an object on which it was impossible to look without terror, the immense quantities of meat which he devoured, the pints of brandy which he swallowed, and which, it was said, he had carefully distilled with his own hands, the fool who jabbered at his feet, the monkey which grinned at the back of his chair, were, during some weeks, popular topics of conversation." He soon removed to Deptford, where he occupied the house of John Evelyn. In one of the streets a tavern is shown, still bearing the sign of the czar's head, where he smoked and drank beer and brandy. He returned to Holland in April in a yacht which King William had presented to him, taking along with him a number of men of science. He thence proceeded to Vienna to inspect the emperor's army, the best in Europe, and was preparing to visit Italy when the news of a rebellion at home caused his return after an absence of 17 months. The insurgents, whom Gordon, his general, had put down, he punished with savage cruelty. Mutiny having raised its head against him twice before, he doubtless thought summary vengeance necessary to the safety of his throne. As a further security he disbanded the strelitzes, a corps of soldiers who had constituted the body guard of the czars, and had always been a hot-bed of court intrigue, and formed new regiments on the German model. For revenue he introduced taxation, which included his subjects' beards, and the skirts of their Tartar coats. As the Russians did not choose to spare these appendages, they became a fruitful source of income. He regulated the press, caused valuable translations to be made and published, and established naval and other schools. He required his subjects to trade with other countries, which was formerly a capital crime. To the horror of the priests, he altered the calendar, making the year begin on Jan. 1 in place of Sept. 1 as before, and instituted the order of St. Andrew, the patron saint of Russia. After thus giving a new vigor to the interior life of his kingdom, he resolved to have a foreign policy also. To recover the provinces of Ingria and Carelia, which had formerly belonged to the Russian monarchy, he formed an alliance with Augustus II. of Poland and the king of Denmark against the young king of Sweden. The first fruit of the league was the disastrous battle of Narva. (See CHARLES XII.) But Peter with unbroken spirit applied himself vigorously to repair his losses, declaring that his enemies would teach him how at length to beat them. He melted down the church bells for cannon, and built as a barrier against Swedish invasion a fleet of small vessels on Lake Ladoga. In 1702 a Russian force defeated the Swedes and took Marienburg. By cautious manœuvring he succeeded in getting possession of the river Neva, at the mouth of which, among marshes, he laid the foundations of St. Petersburg (1703).

In 1704 he became master of the whole of Ingria, and appointed Prince Mentchikoff viceroy. When Augustus, intimidated by the Swedish monarch, abdicated the throne of Poland in favor of Stanislas Leszczynski, Peter entered Poland with an army, assembled a diet, and deposed Stanislas. But Charles XII. soon appearing, Peter found it necessary to retire. The royal Swede was on his march with 70,000 men to execute the magnificent project of wresting Russia from the czar. The rash expedition terminated at Pultowa, July 8, 1709. Peter celebrated a triumph at Moscow, and in the following year conquered the whole of Livonia and Carelia. Charles, who took refuge in Turkey, instigated Achmet II. against Peter. A war ensued, in which the czar was narrowly saved from destruction (1711) by the finesse of his mistress Catharine, afterward his wife and successor (see Catharine I.), and the sacrifice of Azof. He built defensive works in his capital; and by the construction of ships, dockyards, and wharfs, which gave employment to some 40,000 laborers, he laid a substantial basis for commerce. This commerce he inaugurated by making commercial regulations favoring St. Petersburg. In 1713 he removed the senate from Moscow to the new city, and in 1715 the summer and winter palaces were completed. In company with the empress Catharine he made a second tour of Europe in 1716, and was received at Paris with great splendor. He carried back a large quantity of books and works of art to adorn St. Petersburg. His son Alexei, the child of his first marriage, and heir to his throne, evincing a treasonable spirit, was tried and condemned to death (see Alexei); a few days afterward (July 7, 1718) he died in prison, leaving a suspicion of foul play. The protracted differences between Russia and Sweden were finally composed after the death of Charles XII., by the treaty of Nystad (1721), under which Sweden ceded to her rival Livonia, Esthonia, Ingria, a part of Carelia, the territory of Viborg, the isle of Oesel, and all the other islands in the Baltic from Courland to Viborg. For these concessions Russia agreed to surrender Finland, to pay $2,000,000, and to allow a free export of corn, to the annual value of 50,000 rubles, from the ports of Riga, Revel, and Arensberg. Peter now turned all his energies to the development of the industrial resources of his empire. He built canals and factories, established a uniformity of weights and measures, and paved the streets of Moscow and St. Petersburg. He framed codes, organized tribunals, and instituted hospitals. To polish the manners of his court, he ordered the young nobles to visit western Europe in company with their wives. In 1723 he founded at St. Petersburg the academy of sciences. His last war was against Persia, in which he gained the Caspian territories of Derbent, Bakoo, Ghilan, Mazanderan, and Astrabad (1722-'3). At last, being afflicted with a distressing and dangerous disease, he appointed the empress Catharine his successor, and caused her to be publicly crowned a few months before his death.

PETER of Blois, or Petrus Blesensis, an ecclesiastical writer of the 12th century, born in Blois, France, died in England in 1200. He studied at Paris and Bologna, and was afterward a pupil of John of Salisbury, bishop of Chartres. In 1167 he went to Sicily, where he became secretary to King William II. Falling into disgrace, he accepted an invitation from Henry II. to settle in England, was made archdeacon of Bath and chancellor of the diocese of Canterbury, visited Rome on ecclesiastical business during the pontificates of Alexander III. and Urban III., and in the latter part of his life received the archdeaconry of London. By command of the king he made a collection of his letters, 183 in number; beside which there are extant of his several sermons, treatises on doctrinal and ethical subjects, and a work on canon law and process lately discovered.

PETER THE HERMIT, the apostle of the first crusade, born of good family in the diocese of Amiens, France, about the middle of the 11th century, died in a monastery near Huy in 1115. After trying several pursuits in life without finding satisfaction in any of them, he became a hermit, and about 1093 undertook a pilgrimage to Jerusalem, where the oppressions which he witnessed and experienced determined him to arouse the people of Christendom to undertake a war for the liberation of the holy sepulchre from infidels. (See Crusades.) The first company of crusaders which set out for Palestine was led by Peter himself. A part of it afterward separated from the rest under the command of Walter the Penniless, but it was dispersed in a quarrel with the Hungarians. The others reached no further than Nice, where they were defeated by the Moslems. Peter had left them before this, and his name was associated with the succeeding expedition which resulted in the taking of Antioch. While the crusaders were besieged in this city, he deserted, but was captured by Tancred and brought back. On the conquest of Jerusalem he preached a sermon to the crusaders on the Mount of Olives. After this he returned to Europe and founded the abbey of Neufmontier, near Huy, where he passed the rest of his life.

PETERBOROUGH, a N. central co. of Canada West; area, 1,005 sq. m.; pop. in 1851, 15,237. Its surface is undulating, and contains numerous lakes, from which flow several rivers, the largest being the Otanabee. Several railroads diverge from Peterborough, the capital.

PETERBOROUGH, a city of England, in Northamptonshire, situated on the left bank of the Nene, 40 m. by railway N. E. from Northampton, and 76 m. N. by W. from London; pop. 8,672. The cathedral is a fine specimen of Norman and early English architecture. It was founded in 655 by Peada VI., king of Mercia, but was destroyed by the Danes, and has since been rebuilt and received many additions and repairs. It is built in the form of a cross, 476 feet long, with transepts 203 feet broad, ceiling 78 and tower 150 feet high. Catharine of Aragon, wife of Henry VIII., and Mary, queen of Scots, were both buried in Peterborough cathedral; but the remains of the latter were removed by James I. to Westminster abbey. Peterborough is the seat of a bishop, and the dean and chapter exercise a certain jurisdiction over the town. It returns two members to parliament.

PETERBOROUGH, Charles Mordaunt, earl of, a British soldier and man of letters, born in 1658, died in Lisbon, Oct. 25, 1735. His youth until his 17th year was passed in the frivolous and profligate amusements of the court, wearying of which he joined an expedition sent to chastise the Barbary corsairs of the Mediterranean. Having seen severe service at Tripoli and elsewhere, he returned to England, was married, and succeeded to his father's title of Viscount Mordaunt. In 1678–'9 he again served against the Algerines, and upon his return to England took his seat in the house of lords as an opponent of the court. Subsequently he showed a strong sympathy for Lord Russell and Algernon Sidney, the latter of whom, in spite of the menaces of Jeffrey, he supported to the last and accompanied to the scaffold. His pecuniary circumstances becoming embarrassed in consequence of a reckless generosity, and all honorable employment being cut off at home, he repaired in 1686 to Holland, whence he returned to England with the prince of Orange. In April, 1689, he was created first commissioner of the treasury and earl of Monmouth, but retired from office in a few months with no great credit for political integrity. After serving in the campaign of 1691 on the continent, he lived for several years on his estates; but his restless ambition and vanity, which the king's refusal to recall him to power only inflamed, prompted him in 1696 to engage in the Fenwick plot, and he was for several months a prisoner in the tower, where "his only solace was to contrive wild and romantic schemes for extricating himself from his difficulties and avenging himself on his enemies." Released by the leniency of William, and finding himself an object of detestation to both whigs and tories, he again went into retirement, and in 1697 succeeded to the title of earl of Peterborough, inherited from his uncle, Henry Mordaunt, and which enabled him to dispense with the tarnished name of Monmouth. At this time he was reduced to such poverty that he talked of living like a farmer and putting his countess in the dairy to churn and make cheeses. The accession of Queen Anne opened the path of preferment to him, and by paying court to the duchess of Marlborough he procured the appointment of general-in-chief of the forces sent in 1705 to assist the cause of the archduke Charles of Austria, claimant of the crown of Spain. With an army of 7,000 undisciplined troops, principally Dutch and English, he captured Barcelona, having first carried by assault the almost impregnable citadel of Montjouich, which commanded the city, and, in the face of a vastly superior force having every advantage of position, commenced a campaign against the Spaniards, the narrative of which seems more like a chapter of romance than sober history. He quickly overran Catalonia, Aragon, and Valencia, and parts of Murcia and Castile, outwitting and alarming his enemies by the rapidity, secrecy, and mystery of his movements, defeating thousands of men with a mere handful, and not scrupling at any artifice which would insure success or increase his numbers or prestige. The advance in April, 1706, of an army of 20,000 men under Philip V. toward Barcelona, checked the triumphant career of Peterborough, and he hastened back to the city, into which he threw a portion of his forces, while the remainder occupied the heights surrounding the enemy's camp and cut off their supplies. After an obstinate resistance the Barcelonese were relieved by the arrival of a British fleet with supplies and reënforcements, and the besieging force retreated with precipitation, closely followed by Peterborough. Had the advice of the latter been followed at this juncture, and a rapid march made upon Madrid, the archduke might have been established upon the throne of Spain. Peterborough's manners, however, were not such as to conciliate the archduke or his fellow generals, who envied him his military successes and hated him for his arrogance and presumption. Dissensions subsequently arose among the allied generals, and Peterborough, finding his counsels disregarded, quitted Spain in disgust, and in 1707 returned to England, where he experienced a flattering reception, and was thanked by the house of lords for his "wonderful and amazing success." He was subsequently employed on embassies to Vienna and other continental courts, and, as in his Spanish campaign, moved so rapidly from place to place that he used to say that he had seen more postillions and princes than any other man in Europe. His ambition and vanity, joined with undoubted talents, made him in many respects an unsafe person to intrust with diplomatic duties, and he frequently exceeded his authority or gratified his restless desire for display by engaging in mischievous intrigues. Hatred of Marlborough induced him during the last years of Queen Anne's reign to side with the tories; and upon the accession of George I. and a whig administration, he returned to his country seat, and thenceforth ceased to figure in any important public capacity. Throughout his life he was the intimate friend of Dryden, Swift, Pope, Gay, and other eminent men of letters, and had a considerable reputation himself as an elegant writer. He is said to have composed his own memoirs, which after his death were destroyed by his countess, the celebrated singer Anastasia Robinson, with whom he contracted a second marriage in the last year of his life. His eccentricity, impetuosity, vanity, and romantic courage are sufficiently illustrated by the history of his public career. His military genius, brilliant as it was, was better adapted to partisan warfare than to any other kind, and his successes in Spain have been called "happy temerities." Macaulay calls him "the most extraordinary character of that age, the king of Sweden not excepted; . . . . a polite, learned, and amorous Charles the Twelfth;" a comparison suggested by Swift, who in his lines "To the Earl of Peterborough" says he was

> Ne'er to be matched in modern reading
> But by his namesake, Charles of Sweden.

In private life he was generous to profusion, passionate and unreasonable, the slave of temporary whims, an atheist in religious opinion, and almost to the close of his life a confirmed voluptuary. His friends liked him in spite of his faults. Swift confessed he "loved the hang-dog dearly," and he was even admired by Johnson. Burnet says he was "a man of much heat, many notions, full of discourse, brave and generous, with little true judgment, and no virtue." In person he was tall and graceful, but so attenuated that Swift compared him to a living skeleton. A "Memoir of Charles Mordaunt, Earl of Peterborough and Monmouth, with Selections from his Correspondence," by Eliot Warburton (2 vols., 1853), has been published posthumously.

PETERMANN, August Heinrich, a German geographer, born in Bleicherode, near Nordhausen, in Prussian Saxony, April 18, 1822. He was designed by his family for the church, but his preference for the study of geography led him to enter the academy which Berghaus had established at Potsdam. With Berghaus he lived 6 years, acting as his private secretary and librarian, and there made the acquaintance of many scientific men, including Humboldt, for whom he prepared in 1841 the map of central Asia. In 1845 he went to Edinburgh to aid A. K. Johnston in the preparation of the "Physical Atlas;" and in 1847 proceeded to London, where he became a member of the royal geographical society, wrote for the "Athenæum" accounts of the progress of geography, and in conjunction with the Rev. Thomas Milner prepared an "Atlas of Physical Geography." To him is due in great measure the aid which Barth, Overweg, and Vogel received from the English government in their African explorations, and he wrote an "Account of the Expedition to Central Africa." His hypotheses in regard to arctic geography have been supported by the alleged discovery of a polar sea made by Dr. Kane. In 1854 the duke of Saxe-Coburg invited him to occupy the chair of geography at the university of Gotha, and the following year he received the degree of Ph. D. from the university of Göttingen. At the same time he was employed to superintend the geographical establishment of Justus Perthes at Gotha, the largest in the world. From this place he publishes a monthly journal under the title of *Mittheilungen aus Justus Perthes, geographischer Anstalt* ("Communications from Justus Perthes' Geographical Establishment"), which embraces a view of all modern discoveries, with maps and charts.

PETERS, or Peeters, Bonaventura, a Flemish painter, born in Antwerp in 1614, died, according to most authors, in 1652, but according to Valkema in 1671. He was especially distinguished as a marine painter, depicting with great power and truth storms and wrecks. His best works are now scarce.

PETERS, or Peter, Hugh, an English dissenting clergyman and politician, born in Fowey, Cornwall, in 1599, executed in London, Oct. 16, 1660. He was graduated M.A. at Trinity college, Cambridge, in 1622, and preached for some time with great success at the church of St. Sepulchre in London; but having been committed to prison by Archbishop Laud for nonconformity, he removed, upon obtaining his release, to Rotterdam. After preaching to an Independent congregation there for several years, he embarked for New England, and arrived there in Oct. 1635. On Dec. 21, 1636, he became pastor of the church in Salem, succeeding Roger Williams, whose doctrines he disclaimed and whose adherents he excommunicated. During his residence in New England, he took an active part in mercantile and civil affairs; he suggested coasting and foreign voyages and the plan of the fisheries, and aided in reforming the town police. In March, 1638, he was appointed by the general court to assist in collecting and revising the colonial laws. In 1641 he was sent to England to procure an alteration in the laws of excise and trade; and it was probably owing to the influence of himself and his associates that an act of parliament was passed in 1643, relieving all commodities carried between England and New England from the payment of "any custom, subsidy, taxation, imposition, or other duty," till the further order of the house of commons. In England he joined the parliamentary party, became a preacher in the army, and in 1649 accompanied it to Ireland, holding, it is said, a colonel's commission. During the war he also had interviews with Charles I. in regard to his "New England business," in which, says Peters, "he used me civilly, and I offered my poor thoughts three times for his safety." In 1651 he was appointed by parliament one of the commissioners to amend the laws, an office for which he was eminently unqualified; and in 1654 he was made one of the "tryers" of ministers. In 1658 he preached for some time to the English garrison in Dunkirk. Accompanying Monk in 1660 on his march from Scotland to London, he preached before him on a fast day, and, it is said, "troubled the general with a long fast sermon; and at night too he supererogated, and prayed a long prayer in the general's quarters." After the restoration Peters was committed to the tower and indicted for high treason as having been concerned in the death of the king. It was also alleged that he was one of the masked persons who stood upon the scaffold when Charles was beheaded. During his imprisonment he wrote several letters of advice to his daughter, which were subsequently published under the title of "A Dying Father's Last Legacy to an Only Child." His other published works consist of sermons and political treatises. Though not a man of learning, he possessed no mean intellectual powers, and his preaching was rendered very popular among the multitude by the use of coarse but striking images. His private character has been the subject of much discussion both in England and America. He was charged by his enemies with gross immorality, and the most bitter epithets were applied to him by Bishops Burnet and Kennett, Dr. Barwick, Dr. Grey, and others; but of late years he has been estimated more favorably. According to Dr. Palfrey, his name should be written Peter.

PETERS, John Charles, M.D., an American physician, born in New York, July 6, 1819. At the age of 18 he commenced the study of medicine according to the system of Hahnemann, and in 1842 visited Europe, where, in the schools of Leipsic, Berlin, and Vienna, he studied homœopathy under its most eminent teachers, and received the instructions of the chief professors of pathological anatomy, pathological chemistry, materia medica, and the cognate sciences. Commencing practice in New York as a homœopathist, he gradually deviated in several essential particulars from the views entertained by physicians of that school, and is now understood to be in favor of a compromise between the homœopathic and allopathic schools of medicine, both in theory and practice. On this subject he holds that the homœopathic law, *similia similibus curantur*, is not universally true, but is a complement of the general law of medical treatment, *alterantia alterantibus curantur*; that similar things differ as well as resemble, and as a medicine which acts similarly to a disease necessarily acts somewhat differently from it, it follows that homœopathic remedies exert an alterative action, and should be given in sufficient doses to bring about this effect; that as similarity may be considered a lesser or the least *degree of difference*, and antagonism a greater or the *greatest* degree of difference, the apparently antagonistic laws *similia similibus curantur* and *contraria contrariis curantur* are not only not diametrically opposed to, but are the complements of each other; hence homœopathy and antipathy are not in reality opposing systems, but are parts of the great law of specific alterative or specific allopathic treatment. Among the suggestions made by him which have been adopted in medical practice are the employment of alcohol in the treatment of consumption; the use of phosphates in medicine; the curative treatment of Bright's disease of the kidneys with corrosive sublimate; and the use of bromine and bromide of potash as specific remedies in true membranous croup. He has devoted himself especially to the study of the materia medica and the theory and practice of medicine, and has endeavored to incorporate in homœopathy such improvements in medical practice as auscultation and percussion, microscopy, the use of the ophthalmoscope, pathological anatomy and chemistry, &c. His medical publications consist of a "Treatise on Diseases of the Head" (8vo., New York, 1853); "Treatise on Diseases of Females" (8vo., 1854); and "Treatise on Diseases of the Eyes" (8vo., 1855). In conjunction with Dr. Wetherspoon he translated "Rokitansky's Pathological Anatomy" (8vo., 1849); and in conjunction with Dr. F. G. Snelling and others he has published a "Materia Medica" (8vo., 1856–'60). He is now engaged upon a "Treatise on the Principles and Practice of Medicine," published in numbers, and which is to form 2 vols. 8vo. He was also editor of the "North American Journal of Homœopathy" from 1856 to 1861. He was one of the founders of the New York pathological society, and in 1859 was elected president of the American college of medical sciences, and professor of materia medica and therapeutics in the same institution. This college, however, has not yet been opened for students.

PETERS, Richard, an American jurist, born near Philadelphia, Aug. 22, 1744, died Aug. 21, 1828. He was educated in Philadelphia, and embraced the profession of law. At the breaking out of the revolution he became captain of a company of volunteers, and in June, 1776, was appointed by congress secretary of the board of war. On resigning this post in 1781 he was elected a member of congress, and after the organization of the government he was offered by Washington the comptrollership of the treasury of the United States. This he declined, but accepted the office of judge of the U. S. district court for Pennsylvania, a position which he retained for the rest of his life. The admiralty law of the United States may be said to owe to him its foundation. He was also eminent as an agriculturist, being president of the Philadelphia agricultural society; and through his instrumentality the use of gypsum in agriculture and the cultivation of clover were introduced in the United States.

PETERS, Samuel, an American clergyman and historian, born in Hebron, Conn., Dec. 12, 1735, died in New York, April 19, 1826. He was graduated at Yale college in 1757, became in 1760 a clergyman of the church of England, and in 1762 took charge of the churches of Hartford and Hebron. Being a tory, he was forced in 1774 to flee to England, where he revenged himself on the Puritans by publishing in 1781 "A General History of Connecticut," which has been called the "most unscrupulous and malicious of lying narratives." In 1794 he was chosen bishop of Vermont by a convention of that diocese, but was never consecrated to the office. In 1805 he returned to America, and in 1807 published in New York a "History of the Rev. Hugh Peters," his great-uncle. In 1817 he made a journey to the falls of St. Anthony, claiming a large tract of land in that region. He is the "Parson Peter" of Trumbull's "McFingal."

PETERS, Samuel Jarvis, an American merchant, born in York, now Toronto, Canada, July 30, 1801, died in New Orleans, Aug. 11, 1855. He was a descendant of Hugh Peters. After passing some time in a French counting room in New York, he removed to New Orleans in 1821, became clerk in a wholesale grocery house, and in 1823 began business for himself as a wholesale grocer in partnership with a Mr. Millard. Of this firm, which was in time one of the most important in the trade, Mr. Peters continued a member as long as he lived. In 1829 he was elected to the city council of New Orleans, and after the division of the city into municipalities was chosen to a similar office in the second municipality, and made chairman of the finance committee. In the latter capacity he was identified with numerous improvements. He was one of the originators of the Pontchartrain railroad and its first president, of the chamber of commerce, of which he was president until his death, and of the city bank, of which he was also president for 20 years. He was afterward president of the state bank of Louisiana, was appointed collector of the port in 1849, and was instrumental in introducing the common school system into New Orleans. In connection with the schools he founded a public lyceum and library, which are now flourishing.

PETER'S PENCE, an annual tribute of one penny formerly paid to the pope on the festival of St. Peter. In England, where every family possessed of 30 pennyworth of property of any kind was considered liable to this tribute, it was continued from Saxon times to the reign of Henry VIII. The tribute was collected by the bishops. The term is also applied to any general voluntary collection made for the pope, such as that in 1860; on Jan. 1, 1861, the amount received at Rome from this collection had exceeded $2,000,000.

PETERSBURG, a city and port of entry of Dinwiddie co., Va., on the S. bank of the Appomattox river, 12 m. above its entrance into the James at City Point; pop. in 1850, 14,010; in 1860, 18,275. It is the third city in the state in population, and is favorably situated for business. The river is navigable to this place, which is at the head of tide water, for vessels of 200 tons; larger vessels load and discharge at Port Walthall, 6 m. below, on the N. bank of the river, and the largest at City Point. Immediately above the city the falls afford extensive water power. Above the falls the Appomattox is made navigable for bateaux to Farmville, 107 m. Petersburg is connected by railroad with City Point, Richmond, Norfolk, Lynchburg, and Weldon on the border of North Carolina. There is a continuous line of railroad communication from Petersburg to Mobile, and also to Memphis, Tenn. The city is lighted with gas, and abundantly supplied with water from a reservoir. It is well built and naturally drained, the ground descending gradually from the heights on the southern outskirts down to the river. The principal public buildings are the custom house and post office, court house, mechanics' hall, Phœnix hall, and a library of 5,000 volumes. There are 4 banks, 4 savings institutions, 3 daily and 2 weekly newspapers, and 14 churches, viz.: 2 Baptist, 2 Episcopalian, 3 Methodist, 2 Presbyterian, 1 Roman Catholic, and 4 for colored people. There are 50 productive or manufacturing establishments, with an aggregate capital of $1,104,000, consuming annually $2,076,000 worth of raw material, and employing 2,142 males and 961 females; value of products, $3,528,677. The sales of cotton during the year ending Sept. 30, 1858, amounted to 17,028 bales, 1859, 28,069; 1860, 30,000; 1861, 35,000. The receipts of tobacco in 1859 were 26,000,000 lbs.; quantity manufactured, 12,000,000 lbs., in 20 factories. The tonnage of the port in 1859 was 2,562 tons.—Petersburg was incorporated in 1748. It was twice occupied by the British under Gen. Phillips during the revolutionary war. The Petersburg volunteers served with distinction on the Canada frontier during the last war with England, and it was Mr. Madison, then president, who, referring to their gallantry, first styled Petersburg "the cockade of the South."

PETERSEN, Frederik Christian, a Danish philologist and archæologist, born in Autserskon in Seeland, Dec. 9, 1786. He was educated at the university of Copenhagen, and in 1826 became a member of the Danish academy of science, and in 1842 ordinary professor of philology in Copenhagen. Beside contributing to scientific journals many valuable articles, he has written an "Introduction to the Study of Archæology" (Copenhagen, 1825), and a "Handbook of Greek Literary History" (Copenhagen, 1826).

PETERWARDEIN (Hun. *Pétervárad*), a fortress and town of Austria, in the Slavonian Military Frontier, on the right bank of the Danube, 44 m. N. W. from Belgrade; civil pop. about 4,000, garrison 3,000. The fortress is built on a lofty escarped rock overhanging a sharp promontory formed by a bend of the river, opposite the town and steamboat station of Neusatz in the Hungarian county of Bács, contains extensive barracks and arsenals for a large force, and presents to the water and land side a formidable face of walls, port holes, and bastions. The place is of high strategic importance, and the Romans are believed to have had there one of their Pannonian military colonies, called Acumincum. The modern name is traced to Peter the Hermit, who mustered there his motley host of crusaders. Prince Eugene won there a great victory over the Turks in 1716, which completed the deliverance of Hungary from the Moslem yoke. During the war of 1848-'9 Peterwardein was continually in the hands of the Hungarians, capitulating only after the surrender of Görgey and of the fortress of Arad.

PETHERICK, John, a British traveller in Africa. In 1845 he went to Egypt, entered the service of Mehemet Ali as mining engineer, and was sent by the pasha to Arabia Petræa to seek for coal. After extensive unsuccessful researches he returned to Cairo, and in Jan. 1847, was ordered to proceed to Kordofan and report upon some iron mines. He spent several years in the region of the upper Nile in the service of the Egyptian government; but on the death of Mehemet Ali he resigned his employment and established himself as a merchant at Khartoum, where he was made British consul. In 1853, and repeatedly again in subsequent years, he ascended the White Nile, and penetrated beyond all former travellers into the interior of Africa. In 1859 he returned to England, and after a residence there of two years, during which he published a highly interesting account of his explorations, entitled "Egypt, the Soudan, and Central Africa, with Explorations from Khartoum on the White Nile to the Regions of the Equator" (London and Edinburgh, 1861), he set out in April, 1861, from England for another expedition up the Nile, expecting to meet Capt. Speke and his companions in their advance northerly from the lake region of E. Africa.

PÉTIGNY, François Jules Filleul de, a French historian, born in Paris, March 14, 1801. He studied at the school of charts, was appointed in 1826 counsellor to the prefecture of Loir-et-Cher, and after the revolution of 1830, by which he lost his office, devoted himself to literary pursuits, and especially to researches in French history. His first work was an essay "On the History, Laws, and Institutions of the Merovingian Epoch" (3 vols. 8vo., Paris, 1844), for which the institute awarded him the Gobert prize of 9,000 francs; and in 1849 he received a gold medal from the same learned body for his "Archæological History of the Vendômois." He has also published "Observations on Recruiting the Army" (1830), and various historical and antiquarian papers in the *Bibliothèque de l'école des chartes*, the *Revue numismatique*, and the *Mémoires* of the society of sciences and letters of the city of Blois. He was chosen a member of the academy of inscriptions and belles-lettres in Dec. 1850.

PETIGRU, James Louis, an American lawyer, of mixed Irish and Huguenot descent, born in Abbeville district, S. C., about 1789. He was graduated at the South Carolina college in 1809, and a few years later was admitted to the bar, commencing practice as a country lawyer. Having attained great professional eminence in the rural districts, he removed to Charleston, where he rapidly rose to distinction. In 1822 he succeeded Robert Y. Hayne as attorney-general of the state, which office he held for 8 years. During the nullification troubles of 1830-'32 he took sides against the doctrine of the state veto, and became one of the leaders of the "union and state rights" party, which, while adopting to their fullest extent the opinions of the nullifiers on the subject of a protective tariff, and those of Calhoun, McDuffie, Hayne, and others respecting state rights, nevertheless joined issue with the nullifiers on the practicability of applying the state veto to measures adopted by the federal congress. During the controversy, which several times threatened to end in civil war, he showed himself an earnest worker and a vigorous and eloquent speaker; and upon the defeat of his party, he became in his political capacity an object of much popular dislike, his views being considered antagonistic to the recognition of the sovereignty of the state, and identical with measures of federal usurpation. His talents and virtues, and his unquestioned ability as an advocate, nevertheless secured him the respect of the community in which he lived, and he continued to maintain his position as a leader at the bar with scarcely a rival. Subsequently he held for a brief period the office of district attorney of the United States, at a time when such a position subjected him to public odium. He has also served in the state legislature, and is now (1861) a commissioner for codifying the laws and statutes of South Carolina. Although opposed to the secession movement of 1860-'61, he has followed the fortunes of South Carolina; and notwithstanding his views are shared by a very inconsiderable portion of the people of the state, public respect for his character is undiminished.

PÉTION (or Péthion) DE VILLENEUVE, Jérôme, a French revolutionist, born in Chartres in 1753, died by his own hand in 1793. He was a lawyer by profession, and in 1789 was elected by his native town deputy to the states-general. His fine figure and countenance, sonorous voice, fluent speech, fervor, and integrity secured him considerable influence over his colleagues and the people. He was styled *le vertueux Péthion*. He was a bitter enemy of the court and of Mirabeau, and was one of the 3 commissioners who after the flight to Varennes, June, 1791, were sent by the constituent assembly to bring the royal family back to Paris, when he treated his illustrious prisoners with unpardonable roughness, and wished the king to be at once placed on trial. Being elected mayor of Paris in preference to Lafayette, he secretly assisted in the popular manifestation of June 20, 1792, and was consequently suspended from his functions by the departmental directory, but was restored by order of the assembly, which had become alarmed by the popular cry of "Pétion or death!" He participated in the insurrection of Aug. 10, when he caused himself to be kept under guard by his own friends in order to be excused from any active proceedings to quell the troubles; neither did he interfere to stop the dreadful massacres of September. In 1792 he was elected a deputy to the convention by the department of Eure-et-Loir, and nominated the first president of that assembly. He now leaned toward a milder policy, sided with the Girondists, and lost his popularity. He had insisted upon Louis XVI. being tried, and voted for his death, but on condition that an appeal might be made to the people. This was a crime in the eyes of the revolutionists. He was proscribed in conjunction with the Girondists, escaped from Paris, and repaired first to Caen, and then to the vicinity of Bordeaux, where he wandered for some months and finally killed himself. His body was found half devoured by wolves. The works of Pétion were published in Paris in 1793 (4 vols. 8vo.); they consist of speeches and political tracts, of merely temporary interest.

PÉTION (Anne Alexandre Sabès), first president of the republic of Hayti, born in Port-au-Prince, April 2, 1770, died March 29, 1818. His father was Pascal Sabès, a wealthy colonist, and his mother a free mulatto. He studied at the military academy of Paris, served in the French and afterward in the Haytian army, and when the revolution broke out in his native island rendered valuable services to Toussaint and Dessalines as an engineer, and was rapidly advanced. He did much to protect the colonists in that time of terror, and his mild disposition and engaging manners recommended him to all classes. When Toussaint began his proscription of the whites and mulattoes, Pétion took up arms to resist him, and maintained the conflict, with very unequal forces, until compelled to seek refuge in France. He returned from exile as a colonel in the army sent under Gen. Leclerc to subject Hayti anew to her former masters; but the retaliatory cruelties committed by that commander, and the conduct of the French toward Toussaint and Rigaud, impelled him to quit the army; and placing himself under the orders of Dessalines, they once more proclaimed the independence of Hayti (1804). Having succeeded Gen. Clervaux in the government of Port-au-Prince and the command of the mulattoes, Pétion held that post at the time of the assassination of the negro emperor (Oct. 1806). In the dissolution of the government which ensued, the mulattoes rallied round Pétion, whom they preferred, as one of their own caste, to Christophe, the leader of the blacks. Pétion accordingly was elected, June 27, 1807, president of the southern and western parts of the island; an office which was afterward conferred upon him in perpetuity, with the right of nominating his successor. Christophe believing himself entitled to undivided authority, the rivals took up arms, and for several years carried on a war without decisive results, but in which the advantage seems to have been on the side of Christophe, who on one occasion defeated Pétion in a pitched battle, and pursued him to Port-au-Prince. At length the chieftains agreed, without entering into any formal treaty, to suspend hostilities, and leave each other undisturbed. A strip of waste country, 10 miles wide, was made the neutral boundary between their territories. Pétion now applied himself zealously to the improvement of his subjects. With absolute power he preserved the utmost republican simplicity. Property was equitably divided, without respect to distinctions of color; great attention was paid to public instruction, and the general forms of administration were copied from French models. But an insurmountable barrier was opposed to his exertions by the character of the recently emancipated blacks who formed the majority of his subjects. The finances of the country fell into irretrievable disorder; onerous imposts upon commerce were resorted to, and the government was compelled to debase the coinage. The army was a mere rabble, unpaid, undisciplined, and ill fed. All this wretchedness and confusion, which he saw no means of remedying, had at length such an effect on the benevolent, though somewhat over-cautious and irresolute Pétion, that he fell into a state of hypochondria, fancying that he was in danger of assassination. Finally, he refused all medicines and nourishment, and, after designating Gen. Boyer as his successor, died of mere inanition and despondency, amid the universal and profound grief of the people. His body was conveyed to Paris, and now rests in the cemetery of Père la Chaise.

PÉTIS DE LA CROIX, François, a French orientalist, born in Paris in 1653, died Dec. 4, 1713. He was the son of the king's interpreter for oriental languages, and was educated for the same employment, passing several years at Aleppo, Ispahan, and Constantinople. In 1682 he went to Morocco as secretary to the French ambassador, and was afterward employed as secretary-interpreter in the expeditions against Algiers, the negotiations with Tunis and Tripoli, and many other transactions between the French government and the East. In 1692 he was appointed professor of Arabic in the royal college of France, and in 1695 succeeded his father as oriental interpreter, an office in which he himself was succeeded after his death by his son Alexandre Louis Marie. Beside Arabic, Persian, and Turkish, he is said to have understood the Mogul, Armenian, and Ethiopian languages. He spoke and wrote Arabic with remarkable fluency and elegance, and during his residence at Aleppo translated into that tongue an account of the campaign of Louis XIV. in the Netherlands, which was published in 1671. He translated the "Turkish Tales" from Sheikh Zadeh (12mo., Paris, 1707), and from the Persian the "Thousand and One Days" (5 vols. 12mo., 1710–'12), and Sheref-ed-deen Ali Yesdi's "History of Timur" (4 vols., 1722).

PETIT-THOUARS. See Du Petit-Thouars.

PETITOT, Claude Bernard, a French author, born in Dijon in 1772, died in Paris, April

6, 1825. He filled various public offices, devoted his leisure hours to literature, wrote 3 worthless tragedies which he himself suppressed so far as he was able, translated those of Alfieri and the novels of Cervantes, edited Molière and La Harpe, and published the *Répertoire du théâtre français* (23 vols. 8vo., Paris, 1803–'4, and 25 vols. 8vo., 1817–'18), and a collection of *Mémoires relatifs à l'histoire de France* (56 vols. 8vo., Paris, 1819–'34), to which he added biographical and historical essays of some interest.

PETITOT, Jean, a Swiss painter on enamel, born in Geneva in 1607, died at Vevey in 1691. His father was a sculptor and architect; he himself first followed the trade of a jeweller, and, in concert with his master Bordier, gave particular attention to improving the fabrication of enamel. After visiting Italy they removed to England, where, under the direction of Mayerne, the head physician of King Charles I. and a learned chemist, they invented processes for preparing colors which enabled them to excel the best works of Venice and Limoges. Charles I. treated Petitot with marked favor, gave him lodgings in Whitehall, knighted him, and ordered him to make copies of Vandyke's pictures on enamel. He accompanied Charles II. in his exile to France, where the liberality of Louis XIV. induced him to settle. He now copied some of Mignard and Lebrun's best compositions, and painted portraits of many of the celebrated characters of the French court. His masterpiece in this line was the portrait of the countess of Southampton. He accumulated a large fortune. On the revocation of the edict of Nantes in 1685, he was imprisoned as a Calvinist, and released only when lengthened confinement had endangered his life. He now retired to Geneva, where he passed the rest of his days.

PETÖFI, Sándor, a Hungarian poet, born in the district of Little Cumania, Jan. 1, 1823, disappeared on the battle field of Schässburg in Transylvania, July 31, 1849. He was the son of an innkeeper and butcher, and was sent successively to the schools of Aszód, Szent Lőrincz, and Schemnitz; but being wayward, obstinate, and a poetical dreamer from his infancy, he was expelled or deserted from the last named school, and served for some time as scene shifter in a theatre at Pesth, until he was discovered by his father and taken home. He was treated harshly by his father, but tenderly by his mother, and after some 20 months was again sent to school, this time to Oedenburg. Scarcely arrived, he enlisted as a volunteer in an Austrian regiment, with which he was sent to Croatia, and subsequently to Styria; but was soon dismissed, and went to the college of Pápa. He left Pápa in 1842, after having seen his first printed song in Bajza's *Athenæum*, and for some time led the life of a poor strolling player, wandering generally alone through the plains of Hungary, composing short popular songs, and subsisting by the hospitality of the peasantry. From Debreczin, where he spent the winter of 1842–'3, and acted without success in the plays of Shakespeare, he repaired, penniless and on foot, to Pesth, bringing with him a collection of songs, some of which had already appeared in the *Athenæum*. He earned some money by translating one of James's novels and another of Bernard, contributed to the *Életképek* ("Pictures of Life"), and assisted Vahot in editing the *Divatlap* ("Journal of Fashion"). His fame as a writer of popular songs rose from day to day, but he met with little success in other branches of literary or artistic labor, a novel entitled *A hóhér kötele* ("The Hangman's Rope"), and a drama, *Tigris és hiéna* ("Tiger and Hyena"), as well as a last attempt to figure on the stage, proving decided failures. Two popular epic sketches, *A helység kalapácsa* ("The Hammer of the Place"), and *János vitéz* ("Warrior John"), were favorably received. On a tour through the northern parts of Hungary he received marks of enthusiastic admiration. During a subsequent tour along the upper Theiss he married a young girl, a passionate admirer of his poetry. When, at the general convention of the opposition preceding the opening of the diet of 1847, he recited his poem *Dalaim* ("My Songs"), the members rose and embraced him. The events of February and March, 1848, opened for him the career of revolutionary activity. Scarcely had the news of the occurrences at Vienna of March 13 reached Pesth, when Petöfi, accompanied by Jókai, Vasváry, and Bulyovszky, on the morning of the 15th assembled the students of the Hungarian metropolis, and, repairing with a crowd of people to one of the principal printing establishments, compelled the workmen to print without permission from the censor the "Twelve Demands of the Hungarian Nation," and a stirring revolutionary song of the young poet, entitled *Talpra magyar!* ("Hungarians, arise!"). Both were distributed and read before numberless multitudes, amid the general acclamations of the people. The municipality gave its adhesion, a committee of public safety was formed, and the royal lieutenancy of Buda was compelled to yield. Petöfi now devoted his poetry exclusively to quickening the revolutionary movement. Appeals, odes, and battle songs followed each other; and finally he girded on the sword himself, and accompanying Bem on his Transylvanian campaign, with only a short interruption, continued as his aide-de-camp until the disastrous day of Schässburg, where Petöfi was last seen among the scattered remnants of the army, pursued by Cossacks. His dead body was not found. There is little doubt that he was killed by the pursuers; but to this day the popular belief in Hungary is that the great minstrel of the revolution still lives in foreign parts or in one of the dungeons of Austria, soon to reappear. Stories of his alleged reappearance at various places are current, and many a patriotic pen is active in defending the one or the other side of the question, though the widow of the poet has long been remarried. A lively controversy on the subject took place, at the beginning of 1861, in the columns of the Pesth *Vasárnapi ujság* ("Sunday News"), edited by Pákh, an early friend of Petőfi. Among the translators of his songs in German are Szarvady and Hartmann (jointly) and Vasfi (*nom de plume* of Dr. M. Eisler, now of New York). A collection in French, interwoven with interesting sketches of the poet and his country, was published by Chassin under the title of *Le poëte de la révolution Hongroise Alexandre Petœfi* (Brussels and Paris, 1860).

PETRA, an ancient city of Arabia Petræa, about half way between the Dead sea and the head of the Ælanitic gulf. The ancient geographers describe it as situated in a narrow valley, surrounded by precipitous hills, beyond which, especially in the direction of Judæa, were deserts. On the W. side rises Mt. Hor. The entrance to the ruins of this long lost city, first discovered by Burckhardt in 1812, is generally made through the *sik* or ravine of Wady Musa, a winding street of a mile in length, lined on both sides with tombs hewn out of the rocky cliff. At the opening of this avenue is the Khuzneh, the supposed great temple of Petra, but bearing no inscription. It is in the Corinthian style, and is called by the Arabs *El Khuzneh* (the treasure), from a tradition that one of the Pharaohs enclosed a vast amount of money and jewels in an urn surmounting the façade. Beside this and the numerous tombs, which form the most remarkable and interesting remains of Petra, the most striking edifices are the Deir, a huge temple hewn in the rock; the theatre, excavated from the rock, with an arena 120 feet in diameter, and capable of accommodating from 3,000 to 4,000 spectators; and the acropolis. The remains of the city in the plain are now a heap of rubbish.—Petra is supposed to be the same as Selah, referred to twice in the Old Testament (2 Kings xiv. 7, and Isaiah xvi. 1), both names signifying rock. It was a city of Edom, but was taken several centuries B. C. by the Nabathæans, an Arab tribe, who made it their chief city. It successfully resisted the attacks of the Seleucidæ, and Strabo mentions that in his time it was still governed by a native prince. It was then a large and important town, owing its prosperity to the trade of caravans, for which it was a halting place. In the time of Trajan it was under the dominion of the Persians, from whom it was captured by his lieutenant A. Cornelius Palma. It is spoken of by Pliny, Josephus, Eusebius, and Jerome; and in the *Notitiæ Ecclesiasticæ* of the 6th century it is mentioned as an episcopal see. After its capture by the Mohammedans, it disappeared altogether from history, and remained unvisited and forgotten, at least after the beginning of the 13th century, until the discovery of Burckhardt. It was visited by Irby and Mangles, Banks, and Leigh in 1818, afterward by Laborde and Linant, and by Robinson, Stephens, and others.—See *Voyage dans l'Arabie Pétrée*, by Laborde and Linant (Paris, 1830), of which a condensed English translation was published in London in 1845.

PETRARCH (Francesco Petrarca), an Italian poet, born in Arezzo, July 20, 1304, died in Arqua, July 18, 1374. He was the son of Pietro or Petracco (an idiomatic form of Pietro), and his baptismal name of Francesco di Petracco he afterward changed to that by which he is now known. His father, who was a notary of Florence, had taken part in the contests between the Guelphs and Ghibellines which were then desolating Italy, and along with Dante and other members of the Bianchi party was driven from his native city. The family did not remain long in Arezzo, where it settled at first, and when Petrarch was 7 months old his mother, not being included in the sentence of banishment passed on her husband, removed to Ancisa in the neighborhood of Florence. There he remained 7 years, until he was taken to Pisa by his father, who had gone thither in the vain hope of being restored by the arms of the emperor Henry VII. to his original home. Disappointed and disheartened, the father sought finally a refuge for himself and his family at Avignon, then the seat of the papal court, and in the neighboring town of Carpentras Petrarch received his first education. He early manifested a fondness for the classics; but as in that age and that country the law was the principal avenue to private emolument and political preferment, he was, when 15 years old, sent to the university of Montpellier to attend lectures on that subject. From this place he was removed in 1323 to the more famous school of Bologna. But as his passion for literature and aversion to law seemed constantly strengthening, his father hastened to the latter city to repress feelings which threatened to overthrow all his ambitious designs. Copies of the ancient authors, purchased at great cost and hastily concealed, were discovered and thrown into the fire; but the distress of Petrarch was so real, that Cicero and Virgil were rescued half burned from the flames. After the death of his parents, he left the university, and returning to Avignon found that, through the villany of his father's executors, but little of his patrimony was left. Settling at the age of 22 in that city, then one of the gayest and most licentious in Europe, the favor bestowed upon him from the fascinations of of his person and his manner led to his indulgence to some extent in dissipation; but no temptations, however strong, could turn his mind wholly or for a long time away from his favorite studies. To these he applied himself more closely than ever, the profession of the law having been given up. About 1326 he gained the friendship and patronage of Jacopo Colonna, and subsequently accompanied him to his residence at Lombes in Gascony, of which place that nobleman had been created bishop. Before this time, however, an event had taken place which exerted a controlling influence upon the after history of Petrarch. On the morning of April 6, 1327, in the church of St. Clara of Avignon, he saw a beautiful woman a few years younger than himself, with whom he at once fell violently in love. The mystery which for centuries shrouded the name of Laura was never cleared away until the investigations of the abbé de Sade, one of her descendants, who traced out almost all that is authentically known in regard to her life and character. Previously her virtue had been attacked by some, while many more had even denied her existence. In reality, Laura, descended from an ancient family, was the daughter of Audibert de Noves, a Provençal nobleman, and was born at Avignon, probably about 1308. She was possessed of a considerable fortune, and was married in 1325 to Hugues de Sade, whose temper, naturally morose, was probably not materially sweetened by the affection expressed for his wife by Petrarch, as it appears that he was in the habit of scolding her till she cried, and 7 months after her death he married again. There is no evidence that Laura ever suffered the advances of her admirer to pass beyond the bounds of propriety, although it is unlikely that she was altogether indifferent to the attentions of a lover whose praise was immortality. Certain it is that the mind of Petrarch, for the 10 years following his first sight of Laura, was agitated by a constant struggle between his passion and his reason. The summer of 1330 he spent at Lombes in the society of the bishop and of two friends, one a young German, and the other Lello de Stefani, whom he respectively named Socrates and Lælius. Returning to Avignon, he made the acquaintance of the cardinal Giovanni Colonna, and became an inmate of his palace, then the resort of a crowd of learned men and foreigners of distinction, whom political affairs constantly attracted to the papal court. Out of gratitude to that family, he undertook, but unwillingly, to superintend the education of Agapeto, the son of Stefano Colonna the younger, but seems not to have been very successful. At this time Laura, annoyed and alarmed by the assiduity of his attentions, treated him with coldness, and the fame he was gaining he found insufficient to console him. In 1333 he set out on a tour through the north of France, Flanders, Brabant, and a part of Germany, and was received wherever he went with marks of high respect. He hastened home, however, in order to accompany the bishop of Lombes to Rome; but finding that prelate had already gone thither, he remained at Avignon. When John of Bohemia made his unsuccessful expedition into Italy in 1333, Petrarch wrote an indignant epistle in Latin verse to Æneas Tolomei of Sienna, deploring the divisions existing in his native land, and bitterly inveighing against the insolence of the northern invaders. His feelings were then still more deeply stirred by the double prospect of a new crusade and of the transfer of the papal court to Rome; and when in 1334 Benedict XII. succeeded to the chair of St. Peter, Petrarch published an epistle in Latin verse seconding the prayer of the Roman embassy, that the pope would once more fix his residence in the eternal city. Benedict replied by making him canon of Lombes, but did not accede to his request. In this year he appeared in a new character. A suit had been brought before the papal tribunal by the Rossi family against the Correggios of Parma for having broken a treaty, and Azzo da Correggio, the delegate of the latter, employed Petrarch to defend his cause. The poet complied, and was successful in gaining the victory for his friend. But finding it impossible to overcome his love for Laura while in Avignon, he determined to travel, and in 1335 set out for Rome, afterward made a voyage along the southern shores of Europe, and sailed as far north as the neighborhood of the British islands. Under the excitement of travel his health and spirits returned. He now laughed at his former feelings, and, confident that his love was cured, he went back to Avignon, where a sight of Laura plunged him into a passion as fervent and as hopeless as before. It seems, however, not to have been as exclusive as it was lasting and violent, for in 1337 he had a son born to him by a woman whose name and history are alike unknown. This same person afterward bore him a daughter, called Francesca, to whom he was tenderly attached, and whom he made the heir to his property. The scandal created by the birth of a son, to one accustomed to speak with so much bitterness of the licentiousness of the western Babylon, as he frequently called Avignon, affected Petrarch greatly, and in his mortification he betook himself to the rural retreat of Vaucluse, 14 miles from Avignon. There, according to his own account, his ears were disturbed only by the sounds of nature, and within the sight of his eyes no female came save "a swarthy old woman, dry and parched as the Libyan desert." In such a solitude, relieved only by occasional visits of friends, and more frequent ones of strangers attracted by his fame, he continued his studies and his sonnets. He undertook the composition of a history of Rome, from Romulus to Vespasian; but of this work, never finished, only two fragments remain. Here also he began the Latin poem of "Africa," with his favorite Roman character, Scipio Africanus, as its hero. But his passion for Laura remained unabated, and one of his finest sonnets was occasioned by his meeting her one day in the streets of Avignon, and her saying: "Petrarch, you are tired of loving me." Among others, he composed in 1339 the celebrated 62d, 63d, and 64th sonnets, and three canzoni to the eyes of Laura, which the Italians call the three sister graces. On Sept. 1, 1340, one great wish of his heart was gratified by an invitation from the Roman senate to be crowned ed as poet laureate, and on the afternoon of the same day by an invitation from the university of Paris to receive the same honor in that city. This position he had sought for many years, and to gain it had left no means untried. The former invitation he accepted, and chose Robert, king of Naples, as his examiner, who judged him worthy of receiving the laurel, and gave him his own robe to wear on the day of coronation. On April 8, 1341, he was crowned at the capitol by the Roman senator Orso, count of Anguillara, and received letters patent entitling him to the privileges of reading and disputing, of explaining ancient books, of making new ones, of composing poems, and of wearing a crown of laurel or beech or myrtle and the poetic habit. Returning from Rome, he remained at Parma nearly a year, enjoying the friendship and society of the Correggios, who had recently gained the supreme power in that city. While there he was commissioned by the Roman people to go to Avignon for the purpose of inducing the new pope, Clement VI., to fix his residence in Rome. No more successful in this than in the former instance, he was answered by an appointment to the priory of Migliorino. He gave vent to his anger in several severe sonnets, and in a work called "A Book of Letters without a Title," in which he bitterly censured the papal court, saying, among other things, in regard to Avignon, that neither Avernus nor Tartarus could be compared with the infernal place. In the mean time he began the study of Greek, a language which was then scarcely known in Italy. The beginning of 1343 was marked by the death of his friend Robert, king of Naples, and he himself was commissioned by the pope to go to that kingdom in order to obtain from the council of regency appointed by the deceased monarch a recognition of the rights of the papal see during the minority of his daughter Giovanna. Here he was successful in gaining the favor of the young queen, who made him her chaplain and household clerk. Returning to Avignon after a short stay in Parma, he remained several years in that city or in the quiet of Vaucluse. In 1346 he was made prebendary of Parma. More important events now excited him. The revolution which in 1347 Rienzi brought about in Rome, the temporary overthrow of the lawless power of the nobles, and the establishment of order, justice, and tranquillity, promised for a time to realize all of Petrarch's dreams of what Italy might yet be. Although the Colonnas were his friends and nominal patrons, he wrote congratulatory letters to Rienzi. Toward the end of the year he went to Italy, parting for the last time with Laura, who for a long while had treated him with less reserve than before. At Parma he heard of the fate of the Colonna family, and of the fall of Rienzi. His sorrow at the sudden vanishing of his vision of Italian liberty and power was still further heightened by the news that on April 1, 1348, Laura had died of the plague, which in that year desolated Europe. Upon a copy of Virgil he wrote the following celebrated marginal note, the authenticity of which has sometimes been denied, though apparently without any just reasons: "Laura, illustrious for her virtues, and for a long time celebrated in my verses, for the first time appeared to my eyes on the 6th of April, 1327, in the church of St. Clara, at the first hour of the day. I was then in my youth. In the same city, and at the same hour, in the year 1348, this luminary disappeared from our world. I was then at Verona, ignorant of my wretched situation. Her chaste and beautiful body was buried the same day, after vespers, in the church of the Cordeliers. Her soul returned to its native mansion in heaven. I have written this with a pleasure mixed with bitterness to retrace the melancholy remembrance of my great loss. This loss convinces me that I have nothing now left worth living for, since the strongest cord of my life is broken. By the grace of God, I shall easily renounce a world where my hopes have been vain and perishing. It is time for me to fly from Babylon when the knot that bound me to it is untied." The copy of Virgil upon which this was written, after having passed through several hands, remained for a long while in the Ambrosian library of Milan, but was afterward carried to France, and has now for some time been in the imperial library at Paris. Petrarch's devotion did not stop short on this side of the grave. The last half of the *Canzoniere* is a tribute to the memory of the dead Laura, more real and more affecting than the living Laura ever received. Twenty years after, when near his own end, he depicted Laura as appearing to him in a mist, and giving the reason for her varying conduct, in answer to his question as to whether she ever loved him. "It was by this alternation of kindness and rigor," she is described as saying, "that I have led thee, sometimes happy, sometimes unhappy, often wearied in truth, but still I have led thee to where there is no more danger, and I have thus saved us both. There has been little difference in our sympathy, except that thou didst proclaim thine to all the world, and I concealed mine. But complaint does not embitter suffering, nor does silence soften it." At the request of Luigi Conrado of Mantua, he stayed for a time in that city, and also in Padua and Verona. He wrote a letter at this time to Charles IV. of Germany, entreating him to come into Italy and restore peace to that country. In 1350, the year of jubilee, he visited Rome, and after this period he tells us that he subdued his mind by religious reflections so as to be proof against all female fascinations. Certain it is that henceforth his manner of life became more austere, and his thoughts and writings of a graver cast. His friendship for the Carraras led him to remain in Padua during the following winter, and while there he occasionally visited Venice, and became an intimate friend of the doge Andrea Dandolo. To him he addressed in March, 1351, a long letter, praying that he would put an end to the war with the Genoese, then just begun, and predicting that if it were prosecuted disasters would befall both states. In April his friend Boccaccio arrived from Florence, and announced to him the recall of his family to their native city, and the restoration of his ancestral property. He was offered the directorship of the university recently founded in Florence, but this honor he declined. In May he set out for Provence, and reached his transalpine Parnassus, as he called Vaucluse, about the end of June. There he set about the composition of his "Epistle to Posterity," in which he narrated the events of his life down to the middle of 1351. In the summer of 1352 Rienzi was brought a prisoner to Avignon, and being refused an advocate to defend him, Petrarch was extremely indignant, and is said to have written the appeal to the Romans in behalf of their tribune, which is found in his "Epistles without a Title." If written by him, it was probably never published. Clement VI. being near his end at this time, Petrarch wrote him a letter, which brought the medical faculty up in arms against the poet. He advised the pope to send away his physicians, and to consider the whole crowd of them attending him as his enemies. The attacks made upon him for this letter led to his writing his "Four Books of Invectives against Physicians." In May, 1353, he again set out for Italy, and at the pressing invitation of Giovanni Visconti he settled in Milan. His friends were grieved that a man so professedly a lover of independence and hater of tyranny should seem to ally himself with the lord of Milan, dreaded throughout Italy for his power, and detested for his ambition. He received many reproachful letters, and in particular a very severe one from Boccaccio. In reply he sometimes defended himself, at other times confessed that he was entirely in the wrong. The utter defeat of the Genoese by the Venetians off Lughiera, in Sardinia, on Aug. 17, 1353, filled him with dismay, and prompted him to write a letter to the vanquished people; but their sudden submission to the Viscontis prevented the letter from ever being sent. A league was now formed between Venice and the princes of Padua, Modena, Mantua, and Verona against the lords of Milan; and in Jan. 1354, Petrarch was sent to the first named city to make peace. He was unsuccessful in his mission, and though both Giovanni Visconti and Dandolo died soon after, the war went on. A truce was negotiated between the belligerents by the emperor Charles, who, in Oct. 1354, crossed the Alps, and during his stay at Mantua treated Petrarch with great favor. In 1356 Petrarch was sent by the Viscontis to Germany, nominally to justify them in the emperor's eyes, but really to penetrate into his designs and to dissuade him from coming to Italy. After his return he received a diploma, in which Charles created him a count palatine. In the summer of 1357 he settled at Garignano on the Adda, near Milan, and 1359 was spent principally in the composition of his "Remedy against either Extreme of Fortune." In 1360 he went to Paris, in behalf of Galeazzo Visconti, to congratulate King John upon his restoration to liberty. In 1361 he fixed his residence in Padua. During this year his son, Giovanni, who was very dissolute and had cost him much grief and trouble, died; and his daughter was married to Francesco di Brossano, a gentleman of Milan. The plague, which had begun to reappear in various parts of Italy, forcing him to leave Padua, he went to Venice, and to that city gave his books on condition that they should be placed in safety and should neither be sold nor separated. The republic assigned him a residence in a palace called the "Two Towers," and lodged his manuscripts in the church of St. Mark, where some of them are still to be seen. During his stay in Venice he was visited by Boccaccio, driven from Florence by the plague, who brought with him his teacher in Greek, Leontius Pilatus, a Calabrian. Petrarch began once more to learn that language, seeking relief in study from the sorrow by which he was assailed. His old and attached friends were all disappearing, and his eminence had not saved him from the attacks of enemies. In the bitterness of his heart he is said to have wept over his laurels, and to have owned that his crown had been to him nothing but a crown of thorns. In 1368 he removed to Padua, and at the request of the pope, Urban V., attempted to visit Rome in 1370; but being taken sick at Ferrara, he was obliged to give up the journey. He now went to reside at Arqua in the Euganean hills, where he resumed his old habits of labor, keeping 5 or 6 amanuenses, and paying no attention to the advice of his physician. Here also he finished a work entitled *De sui ipsius et aliorum Ignorantia*, written against some disciples of Averroes, who at Venice had annoyed him by their opinions, and who, because he did not yield to the authority of Aristotle, had judged him to be illiterate. In 1373 Francesco da Carrara was obliged to make a humiliating peace with Venice, one of the conditions of which was that he should come in person to that city or send his son to ask pardon for the insults he had offered. He asked Petrarch to accompany his son and address the senate in his behalf. The poet was old and infirm, but he remembered only his ancient friendship for the Carraras, and set out. The first day he was unable to utter a word; but on the second he spoke with something of his accustomed fire. It was his last appearance in public life. After his return to Arqua, he read for the first time Boccaccio's "Decameron," learned the story of Griseldis by heart, turned it into Latin, and sent the version to the author, with a letter, apparently the last he ever wrote. One morning he was found dead in his library, with his head reclining upon an open book. He was buried in the parish church of Arqua.—Petrarch's works may be divided into three kinds: Latin prose, Latin poetry, and Italian poetry. Beside those already mentioned, there are of the first named the following treatises: *De Vita Solitaria*, written in defence of his own love of retirement; *De Otio Religiosorum*, written in 1353 after a visit to his brother, who was a monk; *Apologia Authoris contra Calumnias Galli; De Officio et Virtutibus Imperatoris; Rerum Memorandarum*, a collection of facts from ancient and modern history to illustrate some ethical principle; *De Vera Sapientia; De Contemptu Mundi*, an imaginary dialogue between himself and St. Augustine, which he considered so important as to call it his secret; *Vitarum Virorum Illustrium Epitome; De Republica optime Administranda*, a collection of the principal maxims of Plato and Cicero on politics; *De Vita Beata; De Obedientia ac Fide Uxoria; Itinerarium Syriacum;* several orations, and his epistles. The last named are the most important and interesting of his prose works; they are rich in materials, hitherto never fully used, for the history of the stormy times in which he lived, and in many of the scenes of which he was an actor. His Latin poetry consists of his epic of "Africa;" of 3 books of "Epistles" addressed to his friends, or to various popes, urging their return to Rome; and of 12 "Eclogues," like those of Boccaccio, allegorical, and being really satires against men in power, especially against the papal court of Avignon. At the same time the point of the satires has been in some instances so studiously concealed, that it has baffled all inquiry to discover against whom or what they were aimed. The suspicion which has at times sprung up from expressions in these "Eclogues," that he was a secret enemy of the Roman Catholic church, is wholly unfounded, as his invective is always directed against the abuses which had crept into the church discipline, and not against the doctrines or rites of the church itself. The poem of "Africa," whose general dulness and decent debility are occasionally varied by fine passages, is now rarely read, and never praised, though it gave him in his own age his chief reputation among the noble and the learned. At one time he himself deemed it the greatest of his works. His Latin style, though superior to any other of his age, is neither elegant nor accurate, and is condemned by Erasmus. But whatever his merits or defects as a writer of Latin, as the restorer of classical literature in Italy, and therefore in Europe, his services are unquestioned. He was unwearied in the collecting and copying of ancient manuscripts, but for his efforts many of which would probably have perished. He discovered at Arezzo the "Institutes" of Quintilian; at Verona, the "Familiar Letters" of Cicero; the "Epistles to Atticus," and other ancient writings, beside speaking of having seen some which are now lost. It was Petrarch's ambition to write elegantly in a dead tongue; it was his good fortune to perfect a living language. To the Italian he gave harmony, purity, and even stability; and so wonderfully did he use its resources, that even now scarcely an obsolete word can be found in his writings. His Italian poetry is called *Il canzoniere*, or *Rime di Petrarca*, and consists of over 300 sonnets, about 50 *canzoni*, and 3 short poems in *terza rima*, called *Trionfo d'Amore*, *Trionfo della morte*, and *Trionfo della fama*. The *canzoni* are odes the form of which was borrowed from the troubadours, and the contents of which are usually of a more elevated character than the sonnets. The latter half of the *Canzoniere* is universally regarded as the superior. The fame to which his Italian poetry attained in his own age surprised Petrarch; but great as it was, it was far below the admiration accorded by later times. In 1540 the academy of Florence was founded with the avowed object of illustrating and perfecting the native tongue, and the works of Petrarch were taken as the model by which èvery thing was judged. One sonnet would sometimes be made the subject of a volume, and every word of it the subject of a commentary. To this careful study and imitation of Petrarch, though carried to a ridiculous excess, the Italian writers of the 16th century owe the elaborate elegance of their style. A historical work of Petrarch, entitled *Le vite de' pontefici ed imperatori Romani*, appeared at Florence in 1478, and is now very scarce, although much sought after as one of the earliest specimens extant of Italian prose. The most ancient edition of his Latin works is that of Basel (fol., 1496), and the most complete is that of the same place published in folio in 1581. His letters and autograph manuscripts, many yet unedited, are to be found in the public libraries of Italy. In later times his Italian poetry has usually been printed by itself. There are over 300 editions of the *Canzoniere*, with and without commentaries, of which the best is that of Marsand (2 vols. 4to., Padua, 1819–'20). Of the commentators upon his works, the most conspicuous are Vellutello, Gesualdo, Castelvetro, and, in later times, Tassoni, Muratori, Biagioli, and Leopardi. In 1828 Domenico de' Rosetti published at Trieste a bibliography of his works, with their various editions and commentaries. There are said to be more than 25 distinct biographies, of which the most important are those of Vellutello, Beccadelli, Tomasini, De la Bastie, De Sade, Tiraboschi, Baldelli, Ugo Foscolo, and Thomas Campbell. Very little of Petrarch has been translated into English. The *Trionfi* were versified by Boyd (1807), and the odes and sonnets by Dr. Nott (1808), Archdeacon Wrangham (1817), Fraser Tytler (1810), &c. The first complete translation, by various authors, of Petrarch's Italian poems, forms a volume of Bohn's "Illustrated Library" (London, 1860).

PETREL, the common name of the web-footed oceanic birds constituting the sub-family *procellarinæ*, characterized by tubular nostrils, placed on the basal portion of the culmen and opened in front; the beak as long as the head, straight, more or less compressed, grooved as if composed of several pieces, with the tip strong, arched, suddenly hooked, and acute. The best known genera are *procellaria* (Linn.), the petrels proper, and *thalassidroma* (Vigors), the stormy petrels. The general form of the body is like that of the gulls, but the feet have a very rudimentary hind toe, and the beak is very different, the apical being distinctly separated from the basal portion; the habits also are like those of the gulls, but more oceanic, as they pass most of their lives in skimming over the surface of the waves; they rarely visit the shore except for the purpose of breeding, and then select rocky shores, depositing their eggs on the bare rock. They have a habit of running with closed wings upon the surface of the waves; this faculty has been compared to the walking of St. Peter upon the sea of Gennesareth, and hence the title of this bird, which is a diminutive of the apostle's name. The flight is rapid, powerful, and continuous, the same birds following vessels for many successive days; they sail along with extended wings, without flappings, and with apparently little motion; the higher the wind and the more agitated the sea, the more abundant are these birds, as at such times the crustaceans, mollusks, and other marine animals upon which they principally feed are most easily obtained; from this habit is derived the superstition of sailors that they are the harbingers of a storm.—In the genus *procellaria* the wings are long and pointed, the first quill the longest; the tail moderate and rounded, tarsi shorter than the middle toe, toes long and fully webbed and the lateral ones margined externally, the hind toe a mere triangular claw. The giant petrel (*P. gigantea*, Gmel.; genus *ossifraga*, Homb. and Jacq.) is about 3 feet long and 7 in alar extent, at a distance resembling a small albatross; the plumage is dense, full, and elastic, and the head is wholly feathered; the color above is brownish gray mottled with dusky white, the wings and tail dusky brown; lower parts white; bill, legs, and feet yellow. Common in the southern ocean, it is sometimes seen on the Pacific coast of North America as far up as Columbia river in spring and summer; it is very rapacious, attacking and tearing to pieces the smaller petrels and young gulls; it lays its eggs on the sandy shores of the Falkland islands, where it occurs in immense numbers; the young are fed with oily matters which the parents eject from the stomach for the purpose. The fulmar petrel (*P. glacialis*, Linn.; *fulmarus*, Leach) is about 20 inches long, with an alar extent of 3 feet and a weight of 1¼ lbs.; the bill, iris, and feet are yellow, the latter with a greenish tinge; the head, neck, and lower parts pure white; back and wings light grayish blue, paler on rump, and the tail bluish white; quills and their coverts blackish brown; a black spot before and partly over the eyes. It is abundant in the arctic seas, where it attends the whale ships, seizing the pieces of blubber which fall into the water, and often boldly helping itself from the carcass while the men are at work; it breeds in the northern regions, coming down on the American coast as far as Long Island in the autumn, winter, and early spring, and is pretty common on the banks of Newfoundland, where it feeds on the garbage rejected by the cod fishers. It also breeds in the island of St. Kilda, on the W. coast of Scotland, where the inhabitants eat the flesh and eggs, preserve the down and feathers, and collect the oil vomited by the birds when seized, or obtained by boiling down the young, which is used for burning and for medicinal purposes; the eggs are pure white, with very brittle shells, regularly ovate, 2¾ by 2 inches, and are obtained with great difficulty and danger, as the nests are in the crevices of nearly perpendicular rocks. These are bold and powerful birds, rapid and graceful fliers, excellent swimmers, but awkward on land; they rarely dive; they are hardy, difficult to kill from the thickness of the plumage, and can inflict severe wounds with the bill. Other species found on the American coast are the Pacific, slender-billed, and tropical petrels, respectively the *P. Pacifica*, *tenuirostris*, and *meridionalis*, the first two found on the Pacific coast, and the last on the Atlantic from Florida to New York. The pintado petrel, or Cape pigeon (*P. Capensis*, Linn.; genus *daption*, Steph.), is about 15 inches long; the general color is white above varied with brown; the upper part of head and hind neck plumbeous black, smaller wing coverts the same, tipped with brown, the larger white margined with black; primaries white on the inner web and black on the outer; secondaries and tail white with dark tips; lower parts white; bill black. This species is abundant in the southern ocean, with the albatross and other petrels; it has been seen on the coast of California. More than 20 other species are described.—In the genus *thalassidroma* the bill is shorter and more slender and weak; the nostrils open by a single tubular aperture, as in the preceding genus; the 2d quill is the longest, the tail more or less forked, the legs long and slender, with an extensive bare space on the tibia, tarsi longer than the middle toe, and the hind toe a small claw. The species, about a dozen, are of small size, inhabiting the surface of the sea in both hemispheres, skimming lightly and irregularly over the waves, floating buoyantly upon them, or running along the tops; they follow vessels for great distances, feeding upon the greasy matters thrown overboard and on minute marine animals; they are of a dark color, more or less marked with white, and are popularly called Mother Carey's chickens and sometimes sea swallows. The common stormy petrel or Mother Carey's chicken (*T. pelagica*, Vig.) is about 5¾ inches long, with an alar extent of 10½, the bill and feet are black; the color is grayish black above tinged with brown; below sooty brown; secondary coverts margined with grayish white, and quills black; rump and upper tail coverts white with black shafts, the tail coverts broadly tipped with black. They are thought by sailors to forebode stormy weather, and are therefore dreaded and scrupulously unmolested; they occur in most parts of the temperate Atlantic, and are common about the banks of Newfoundland with the other species. They breed on rocky shores and islands in the N. Atlantic, on St. Kilda, and the Shetland islands; in the latter they begin to lay toward the end of June, depositing a single egg in a nest made of plants and earth, carefully concealed, sometimes at a depth of 3 or 4 feet, under the stones on the beaches; they remain quiet by day, becoming active about twilight; the eggs are 1⅛ by ⅞ inch, white, with minute dull red dots at the larger end. According to Brünnich, this bird becomes so fat that the inhabitants of the Färöe islands string it to a wick, and use it as a lamp. Other species of this genus found in America are the fork-tailed petrel (*T. furcata*, Gould), wholly bluish gray, with legs and feet brown; it is about 8 inches long, and is found on the coasts of Oregon and Russian America; Leach's petrel (*T. Leachii*, Bonap.), sooty brown, with white rump, tail forked, and tarsi and feet black, found from Massachusetts to Baffin's bay; Wilson's petrel (*T. Wilsonii*, Bonap.), differing from the last in the darker color of the brown, the slightly emarginate tail, and the yellow color of the basal two thirds of the webs; the black petrel, on the coast of California (*T. melania*, Bonap.), entirely black above and sooty below.—In the genus *pelecanoides* (Lacép.) the bill is shorter than the head, broad, depressed, and swelled at the sides; beneath the bill is a membranous pouch capable of extension; nostrils opening by 2 tubular apertures; wings very short, as are the tarsi and tail; toes long, the hind one wanting. A few species are described, inhabiting the coasts of New Zealand, Australia, and the extreme parts of South America; they are seen in troops, and dive very frequently, probably in search of small fish; they are rather poor fliers, compared with other petrels.—In the genus *prion* (Lacép.) the bill is longer, depressed, with nearly straight culmen, sides dilated near the base and beset posteriorly with fine parallel laminæ; nostrils with 2 openings, short and elevated; the hind toe a mere claw. The broad-billed petrel (*P. vittatus*, Lacép.), found between lat. 35° and 70° S., is bluish ash above, with tips of quills and wing coverts black; it is wild and solitary, a rapid flier, and constantly on the wing; the nests are made in society, in burrows of about a yard deep, excavated in the sides of hills near the sea; the eggs are white, elongated, like those of a pigeon; some of the characters of the bill resemble those of the fishing ducks.—For the genus *puffinus* (Briss.) see SHEARWATER.

PETRIFACTIONS. See PALÆONTOLOGY.

PETROLEUM (Lat. *petra*, a rock, and *oleum*, oil), rock oil, a natural product of the soil in some countries, oozing up from below the surface, and flowing out with the water springs. As it occurs in nature it is of no definite composition, but consists of various oily hydrocarbons, which hold in solution paraffine and more or less solid bitumen or asphaltum. When of the greatest fluidity they resemble naphtha, and have been called by this name, and also oil of naphtha. As the proportion of asphaltum increases, the mixture becomes thicker and darker, resembling tar in appearance; and at length, by further diminution of the fluid ingredients, it passes into asphaltum. Tar lake in Trinidad, described in the article BITUMEN, consists of asphaltum with not enough petroleum to keep the whole fluid at ordinary temperatures. Such mixtures are of little value; but the liquid oily bitumens in some countries are very important products, and in the United States have become so since the article referred to was printed, three years ago (1858). The various forms of these substances were known to the ancient Greeks and Romans, and by Tacitus, Pliny, Vitruvius, and other Roman writers were designated *bitumen*, a word derived from the Greek *πιττα*, *πισσα*, pitch, and probably first written *pitumen*. Among the localities cited, where the liquid bitumen was found, is one of the Ionian islands, Zacynthus, now Zante. Being referred to by Herodotus, this spring must have been flowing more than 2,000 years, and how long before his time we know not. At Agrigentum in Sicily the petroleum was collected and burned in lamps as a substitute for oil. (Dioscorides, i. 99.) The origin of these fluids is very obscure. They appear to be of organic nature, and do not differ from products distilled from bituminous shales and coal; but they are found in geological formations which were not repositories of great bodies of vegetable or animal substances, and are rarely met with in proximity to beds of coal. Around volcanoes petroleum is often seen floating upon the surface of the water, as around the volcanic isles of Cape Verd; and to the south of Vesuvius a spring of it rises up through the sea. Everywhere it is accompanied by springs of common salt, and by jets of carburetted hydrogen gas. The following are some of the most noted localities of it: Amiano and other places in the north of Italy, which have furnished the supplies used for lighting the cities of Parma and Genoa; Bakoo in Georgia, on the borders of the Caspian; Rangoon in Burmah; the island of Trinidad; and portions of Pennsylvania, Ohio, New York, &c.* In northern Italy, in the duchies of Parma and Modena, petroleum has been extracted from the earth since its first discovery in 1640, the method pursued being merely to sink pits in the ground, and collect the fluid that exuded from the soil in little basins or reservoirs in the bottom of the pits. The various sorts were gathered from different localities, and their peculiar properties appear to have been correctly observed; but no methods of purifying them were employed; on the contrary, the lighter and better oils were made the medium of utilizing the poorer sorts by mixture. The W. shore of the Caspian (see BAKOO) has been celebrated from a remote period for the extraordinary quantities of inflammable gases and liquids that rise from the surface of the ground. They are met with over a tract of country about 25 m. in length and about ½ m. in width, in strata of a porous argillaceous sandstone belonging to the tertiary period. In the vicinity are hills of volcanic rocks through which springs of the heavier sorts of petroleum flow out. The oil is collected by means of large open wells sunk 16 to 20 feet in depth, and in these it gathers as it oozes out from the strata. It is observed that the oil from the central portion of the tract is clear and pure as if distilled, and by its faint yellow tint resembles Sauterne wine. That obtained nearer the sides of the tract is darker, gradually changing to a yellowish green, then reddish brown, and finally to asphaltum. The quantities annually collected and sold amount in value, as stated by M. Abich in his work on that country, to 9,000,000 francs; and the sales might easily be made to double this extent. The oil is introduced very largely into Persia, and over large districts there no other material is used for producing artificial light.—The Rangoon district on the Irrawaddy is quite as wonderful for its immense production of rock oil as Bakoo. For an unknown period the whole Burman empire and a considerable portion of India have been supplied with oil from this source. The trade is carried on by means of large boats that come up the Irrawaddy to the town of Rainanghong, a place inhabited by potters, who are constantly making the earthen jars in which the oil is kept. These are piled up in great pyramids about the town ready for use. The wells are in beds of sandy clays which rest on sandstones and argillaceous slates, and are sometimes sunk to the depth of 60 feet. Under the slates is said to be coal; but this and the other strata may be of the tertiary epoch. Symes ("Embassy to Ava," vol. ii.) states that the number of wells in this district exceeded 520, and the annual yield of petroleum was more than 400,000 hogsheads. The natives use the oil in lamps, for preserving timber against insects, and as a medicine. It has recently been imported into England, in metallic tanks to prevent its volatile portions from escaping; and at the great candle factory of Messrs. Price experiments have been made to test its qualities for affording paraffine for candles. The material is described as of semi-fluid consistence, like goose grease, its color greenish brown, and its odor peculiar but not disagreeable. Distilled with steam at successively increasing temperatures below 500° F., the fluid hydrocarbons that came over were almost free from paraffine; but the products which required a temperature of 612° and upward solidified on cooling and contained most of the paraffine, which might then be separated by pressure. Its total proportion is from 10 to 11 per cent.—The occurrence of petroleum about the head waters of the Alleghany river in New York and Pennsylvania was known to the early settlers of that region. The Indians collected it on the shores of Seneca lake, and it was sold as a medicine by the name of Seneca or Genesee oil. A stream in Alleghany co., N. Y., was named Oil creek in consequence of the appearance of oil in its banks; and the same name was given to another branch of the Alleghany river in Venango co., Penn. Several localities are designated upon the old maps of this part of the country as affording oil; and upon Oil creek in Venango co. two spots were particularly noted, one of which was close to the N. line of the county, and one about 12 m. further down the stream. At these points springs issued from the banks of the stream, bringing up more or less oil, which collected upon the surface of the water as it stood in the pools below the springs. The inhabitants were accustomed to collect the oil by spreading woollen cloths upon the water, and wringing them when saturated. Down the valley of this creek there are numerous ancient pits which appear to have been excavated for the purpose of collecting oil, but by whom made no one can now tell. From the fact that logs have been found in them notched as if with an axe, some have supposed that the work was done by the French, who occupied this region in the early part of the last century; but others believe that the Indians, who are known to have valued the oil, dug the pits. Day, in his "History of Pennsylvania" (1844), gives an account of the estimation in which they held this product, using it mixed with paint to anoint themselves for war, and also employing it in their religious rites. He quotes an interesting letter from the commander of Fort Duquesne to Gen. Montcalm, describing an assembly of the Indians by night on the banks of the creek, and in the midst of the ceremonies their firing the scum of oil that had collected upon the surface of the water. As the flames burst forth, illuminating the dark valley, there rose from the Indians around triumphant shouts that made the hills reecho again. The scene recalled to the writer the accounts of the ceremonies of the Guebres or ancient fire worshippers of the sacred city of Bakoo. The quantities of oil collected by the early settlers were unimportant, the largest amount, which was from the lower spring on Oil creek, reaching sometimes 20 barrels in a year. No suspicion appears to have been entertained that the supplies could be increased by sinking deep wells through the sandstones and shales that underlay the valley; and it was not known that by distillation and chemical treatment the quality of the petroleum could be greatly improved. Even when, in boring for salt near Tarentum, 35 m. above Pittsburg on the Alleghany river, springs of petroleum were struck in 1845, the material was valued only as a medicine, and for this use has been ever since retailed in small quantities at high prices. In Ohio, on the Little Muskingum, the inhabitants narrowly missed learning the importance of this product as far back as the year 1819. Dr. S. P. Hildreth of Marietta, in an account of the region written in that year and published in the "American Journal of Science" (1826), speaking of the borings for salt water, says: "They have sunk two wells, which are now more than 400 feet in depth; one of them affords a very strong and pure water, but not in great quantity. The other discharges such vast quantities of petroleum, or as it is vulgarly called 'Seneka oil,' and beside is subject to such tremendous explosions of gas as to force out all the water and afford nothing but gas for several days, that they make but little or no salt. Nevertheless the petroleum affords considerable profit, and is beginning to be in demand for lamps in workshops and manufactories. It affords a clear, brisk light, when burnt in this way, and will be a valuable article for lighting the street lamps in the future cities of Ohio." It is not a little singular that, with the sources of supply thus pointed out and the useful application of the petroleum understood, its value should have remained unappreciated, and at the expiration of more than 35 years be at last perceived through the progress of experiments made upon the distillation of bituminous shales and coal. The success attending these, and the identity of the crude oil with the natural petroleum, caused attention to be directed to the sources of this with the view of testing the capacity of the supplies, and applying to the natural oil the methods of purification invented for the artificial. The first movement made in this direction was in 1854, by Messrs. Eveleth and Bissell of New York, who secured the right to the upper spring on Oil creek, and organized a company in New York. The quality of the oil was tested and a report made upon it by Prof. B. Silliman, jr. No progress, however, was made in establishing the business until Dec. 1857, when Messrs. Bowditch and Drake of New Haven undertook to search for the oil. Col. E. L. Drake removed to Titusville on Oil creek, and in the winter of 1858–'9 completed his arrangements for boring into the rock below the bed of the creek. The work advanced very slowly, and it was not until Aug. 26, 1859, that oil was struck at the depth of 71 feet. The drill suddenly sank into a cavity in the rock, and the oil rose within 5 inches of the surface. A small pump being introduced, a supply of oil was obtained, amounting to 400 gallons a day; and a larger pump being afterward substituted, the flow was increased to 1,000 gallons a day. Though a steam engine was applied to the work and kept in constant operation, the supply continued uninterrupted for weeks. This success gave a new value to every spot where oil had ever been found or was thought likely to produce it. The narrow valleys of the water courses, excavated 300 or 400 feet through the piles of horizontal strata, had been its natural outlets, and along these great numbers of wells were soon commenced. Oil creek below Titusville, the valley of the Alleghany from below Franklin up into Warren co., and the banks of French creek, were soon explored by wells, and around the most successful of these villages rapidly sprung up, and extraordinary business activity was introduced into regions that had been among the most retired and quiet portions of the state. Next to Oil creek the valley of the Alleghany, from Tidioute in Warren co., S. to the Venango line, contained the most productive wells, and others of great yield were opened in the town of Franklin. So numerous were these undertakings, that the village presented a curious aspect with the numbers of tall derricks, employed in boring the Artesian wells, scattered among the gardens and house lots. Before the close of the year 1860, according to one published statement, the number of wells had amounted to full 2,000, and 74 of these were producing daily as follows:

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* Springs of it are reported by Capt. Stansbury on a branch of Yellow creek, 83 m. from Salt Lake City, on the route toward Fort Leavenworth, Kansas. They occur near a bed of bituminous coal and near several sulphur springs. The emigrants, he observes, collect the petroleum for medicinal purposes and for greasing their wagon wheels. (Stansbury's "Exploration and Survey," Senate Documents, 1851, p. 226.)

Locality.	No. of wells.	Product, bbls.
Oil creek	33	485
Upper Alleghany river	20	442
Franklin	15	139
Two Mile Run	3	64
French creek	3	35
Total	74	1.165

The barrels holding 40 gallons each, the daily yield of these wells was by this estimate 46,600 gallons; and of the whole district it probably exceeded 50,000 gallons. At 20 cents per gallon, to which the price of most of the oil had fallen on the spot, the value of the daily product was $10,000. The productive wells vary greatly in depth. In some large supplies are afforded at 60 or 70 feet, and in others at greater depths to over 500 feet. Most of the oil is from wells over 180 feet deep and less than 280. Shallow wells, that are exhausted by pumping, are often made to yield again by sinking them deeper. Several wells may continue in successful operation near together without seeming to draw upon each other; and again wells may be sunk near others that are producing largely, or near the natural springs of oil, and prove unsuccessful. The pumps are sunk deeper into the wells as the supply goes down; and it is observed that if the pumping is interrupted for a day, the product obtained when it is re-owed will be water, which is more or less salt. At some wells the flow of water has continued during several days' pumping before the oil was recovered. This never seems to fail entirely, unless it be from some obstruction arresting the flow, and then recourse is had to sinking deeper or enlarging the bore of the hole. Salt water commonly comes up with the oil, and is separated from it by standing in the vats into which the products are received. The proportion of this to the oil is very variable, and the quantity of oil daily pumped from a single well is far from being regular. A yield of 10 or 15 barrels a day is common, and some wells have averaged 50 barrels for a considerable time. Instances have occurred of the oil, when first struck, rushing up with great violence by reason of the pressure of the carburetted hydrogen gas that accompanies it; the effect being like that attending the uncorking of a bottle of fermented liquor. At one well near Tidioute it is stated that a workman was knocked over by the jet of oil, which was thrown up through the derrick and into the trees around. The open well around the tube was filled by the overflow, and 100 barrels or more of oil, it was supposed, escaped into the river.—Beside the localities already noticed, several other places have recently become known for their oil wells. Upon the margin of the coal field in Trumbull co., Ohio, at a place called Mecca, 50 m. from Cleveland and 21 from Erie, Penn., wells were first sunk in the spring of 1860, the encouragement for making the trial consisting in the fact of the water in the wells being strongly impregnated with oil. Petroleum was soon obtained at the depth of 50 feet; and in November of that year it was stated that over a small district from 600 to 700 wells had been sunk, and 75 steam engines were in operation pumping oil. In Allegany co., N. Y., about a mile N. W. from the town of Cuba, operations were commenced about the first of Jan. 1861, near a famous great pool, which had always been known as the oil spring. Before the iron pipe driven into the ground had reached the rock, oil mixed with water gushed violently up through it. From another well sunk in the rock near by more oil has also been procured. In Virginia wells are in successful operation in Ritchie and Wirt cos. In Canada West also oil has been obtained for the last two years, which is remarkable for its peculiarly offensive garlicky odor.—The process of sinking the wells does not differ essentially from that described under ARTESIAN WELLS. But the mode of securing an opening down to the rock is novel and ingenious. In the creek bottoms the excavation and walling of an open well is troublesome on account of quicksands, and those which have been made through the superficial covering of sand, gravel, and clay have necessarily been large and their sides secured by timbering, as practised in mining shafts. To avoid this trouble, strong iron pipes of 4 to 6 inches diameter, made for the purpose, are driven through the soil down to the rock, one pipe bolted upon the top of another, to any depth required, which is usually not more than 22 feet. If obstacles are encountered that cannot be pushed aside even after being broken up by the drills working through the pipes, the work is abandoned in that spot and commenced in another. The derricks erected for supporting the apparatus for drilling, and afterward that for pumping, are pyramidal structures of 4 corner posts, 30 or 40 feet long, framed together so as to include a square of 10 to 14 feet on the sides on the ground, and of 4 or 5 feet at the top. Covered with boards, they make a convenient shelter for the workmen. The drills are worked either by men or by horse or steam power. A stiff spring pole firmly secured at one end lifts the drill and rods suspended from its free end, and the power is applied at this end to make it suddenly descend. When managed by men, two standing together place each a foot in a double stirrup suspended from the pole and suddenly bear it down. Immediately it springs up, and they repeat the operation.—The source of the petroleum is an interesting question, particularly as it bears upon the probable permanence of the supply. Though we obtain the rock oil artificially only from bituminous shales and coal, its occurrence is not always limited to localities where large bodies of these formations are known to exist. On the contrary, springs of it issue in different parts of the world from all the stratified rocks, and from the volcanic and metamorphic formations. It is sometimes traced to beds of lignite, and sometimes its source is altogether obscure. In Ohio and Virginia it is found in the coal measures, and the wells are in some instances sunk through these into the sandstones and slates beneath before they become productive. In N. W. Pennsylvania or in New York the wells are entirely outside of the coal field, and so remote from it that we cannot well imagine any connection between the oil and the coal beds. The strata in which the oil is found dip S. and pass below the coal measures at least 500 or 600 feet, the nearest coal bed to the more northern springs occurring in the tops of the highest hills, perhaps 30 m. distant. The conglomerate which underlies the coal formation caps some of the hills in the oil region, and attains a thickness of from 100 to 300 feet. The shales and sandstones that succeed below this rock belong to the Chemung and Portage groups of the New York geologists, and extend over a large portion of southern New York, to the W. of Binghamton, and of N. W. Pennsylvania. The oil wells are bored in this group through alternating layers of shales and sandstones, and an occasional stratum of a bluish sandy limestone. The next group below is that known as the Hamilton shales in New York, and in Ohio as the black slate. Dr. Newberry of Ohio considers this the source which affords the petroleum. It contains much carbonaceous matter, and is supposed by him to be amply sufficient for generating the supplies that are forced upward from it by the water that finds its way beneath the oil, and by the pressure of the carburetted hydrogen gas also furnished from the same source. It is from these slates that the oil springs of Canada West issue, and these are far distant from the coal formation. Through the open seams, that are common in the shales and sandstones, the oil currents find a passage, sometimes coming out to the surface; and it is owing to the irregularities of these seams that wells sunk near together vary in their yield, in the depth at which they become productive, and even sometimes, as in the Kanawha region of Virginia, in the quality of the oil they afford. Although nothing certain can be predicated of the capacity of the supply, and actual experience alone can determine this question, there is certainly abundant encouragement for expecting a large and long continued production from the great extent of the oil region, and from the history of the oil districts of Bakoo and Rangoon, which, though drawn upon for centuries, have never failed to furnish the immense supplies demanded of them. Single wells will continue to fail as they have done, but new ones will renew the supply, and the old may recover that which they have lost. It seems impossible that as a whole the business can fail to continue to be one of great importance.—Petroleum of different localities varies considerably in character. The substance is ordinarily of a greenish hue, more or less deep and opaque; but some varieties of light clear oils have a reddish color. All have a disagreeable smell, which is not completely removed by the ordinary process of purification. Their quality is indicated by their specific gravity, and this is taken by Baumé's hydrometer, the higher degrees of which mark the lighter oils, such as are most esteemed. The best are some of those of Oil creek, of 46° B. Others of the same district increase in density to 38°. At Tidioute oils are obtained of 43°. At Franklin they rate from 33° to 36°, and on French creek also they are heavy. At Mecca they are dark, thick, and heavy, so that when cold they refuse to flow. Their density is 26° or 27°, corresponding to a specific gravity of about 0.90. The oil from Cuba, N. Y., resembles that of Franklin, marking 32°.—In the rectification of petroleum the light oils that first come over are often called benzole, and are sold, put up in small quantities, for some of the purposes to which benzole is applied, as removing grease spots from fabrics; but no real benzole is ever a product of the distillation. The proportion of light oils suitable for illumination amounts in the very best petroleum to 90 per cent., which however is rarely obtained; and from this the yield diminishes to 80 per cent. or even a lower proportion. The heavy oils separated from the lighter are of comparatively little value. They are used for lubricating machinery, and for this purpose are advantageously mixed with about an equal proportion of lard oil, the petroleum imparting to the mixture its useful property of not congealing at low temperatures, and also correcting the tendency of the latter to gum, while the lard oil imparts body to the mixture, in which the petroleum is deficient. They have also been applied in woollen factories to the cleansing of the wool, and where thus used a preference is already given to them over other oils. Paraffine, which remains with the heavy oils and is separated from them by condensation at low temperatures, filtering, and pressing out, as stearine is separated from lard, is of variable proportion, averaging perhaps a pound to 4 gallons of the petroleum. The heavier oils do not produce it in larger proportion than the lighter, and some of them, which appear to be isomeric with paraffine itself, afford very little of it. (See PARAFFINE.)—Petroleum acquired a reputation as a medicine before it was used for other purposes; and there is no doubt it possesses some virtue, especially as an outward application in diseases of the skin, chilblains, rheumatism, &c. Taken internally in doses of 30 to 60 drops, it acts as a sudorific and stimulating anti-spasmodic. It has been recommended for disorders of the chest, and in Germany as a remedy for tapeworm.—REFINING. The processes employed in refining petroleum are the same as those devised for the rectification of the crude coal oils; and in describing them it will not be out of place to include a further account of the coal oil manufacture, which since the publication in this work of the article COAL PRODUCTS, containing a short notice of it, has attained great importance in the United States. The extraction of oil from bituminous substances, as shales, coals, asphaltum, &c., is no new discovery. The first announcement of the discovery that oil might be thus procured is contained in the specification of a patent granted in England in 1694 to Martin Eele, Thomas Hancock, and William Portlock, for "a way to extract and make great quantities of pitch, tar, and oyle out of a sort of stone, of which there is a sufficient found within our dominions of England and Wales." The stone proved to be a bituminous shale; but no practical results appear to have followed the discovery and the patent. In 1716 the Messrs. Betton of Shrewsbury patented a process for extracting oil from the black, pitchy, flinty rock commonly found overlying the coal beds. This must have been the bituminous shales; and their method was to grind them to powder and subject the material to destructive distillation. The product was used only as a medicine, and was noticed as such in 1761 in Lewis's "Materia Medica," under the name of British or petroleum oil, "extracted by distillation from a hard bitumen or a kind of stone coal found in Shropshire and other parts of England." The substance and the method of procuring it received occasional notice in the scientific journals; the earliest paper of much interest containing an account of Dr. Clayton's experiments was published in the "Philosophical Transactions" of Jan. 1739. But it was about

20 years after this before any decided advance was made in adding to our knowledge of the products of the slow distillation of organic bodies. The character of the coal gas was understood, and how to obtain it by distilling bituminous substances at high temperatures; and some of the compounds of hydrogen and carbon, derivable from the liquid products of this distillation, were eliminated and described. But the products of the slow distillation were known only as oily fluids, possessing no interest except as empirical medicines, when Reichenbach of Moravia undertook to investigate their properties, and extended his researches to the great variety of products of the destructive distillation at high and low temperatures of organic bodies, of animal as well as vegetable nature. The great number of new substances which he thus discovered, together with the promise that several among them might be applied to useful purposes, gave great interest to the accounts of his investigations which appeared in the scientific journals of Germany in 1830 and 1831. He was the first to describe the substance paraffine, which he obtained from wood tar, and to notice the distinction between it and the similar substance naphthaline, which is derived from the liquid products of the rapid distillation of bituminous matters, as practised in making gas. The mixture of the several hydrocarbons, such as constitute the purified coal oils, he called eupion (Gr. εὖ, very, and πίων, fat). He recognized the qualities in these oils that rendered them in no respect inferior to the finest oils for burning in lamps to produce light, and observed that a cheap method of separating them from the tarry residues was alone required to bring them into extensive use for domestic purposes. These valuable contributions to science and art were published in different numbers of the *Journal für Chemie und Physik* of Schweigger-Seidel, of the *Neues Jahrbuch der Chemie und Physik*, and in Erdmann's *Journal für praktische Chemie*, for 1830-'31. They attracted the attention of scientific and practical chemists in other parts of Europe, some of whom in France particularly were already engaged in the extraction of the oils from bituminous substances, a patent for which had been granted in 1824 to MM. Chervau; and in 1832 Blum and Moneuse patented the application of these oils to illuminating purposes. The latter had a factory near Autun in the department of Saône-et-Loire for treating the bituminous shales of that district; and the chemist Laurent was at this time engaged in conducting the operations, who a year or two afterward was succeeded by Selligue. The papers published by these chemists, and especially the specifications of the patents taken out by the latter from 1834 to 1845, published in the *Brevets d'invention*, present full details of the operations, which they had already brought to such a state of perfection, that the subsequent improvements introduced consist merely in comparatively unimportant modifications of the apparatus employed. Up to the year 1861 no *treatise* upon the subject had appeared at all comparable to that in the specification of the patent of March 19, 1845 (*Brevets d'invention*, new series, iv. 90). Of this an English translation is recorded in the specification of the patent of Du Buisson, No. 10,726 of the English patent office. (See also a paper on the history of this manufacture by F. H. Storer, in the "American Journal of Science," vol. xxx. pp. 121 and 264, 1860.) In this specification, Selligue describes first the apparatus employed in the distillation, in one form of which he makes use of superheated steam. The products of the distillation are then enumerated, which are as follows: 1, a very limpid whitish volatile oil, almost without odor, useful as a solvent or for illumination in suitable lamps, and sometimes known as naphtha; 2, a straw-colored oil, somewhat volatile, of specific gravity 0.84 to 0.87, almost odorless, and suitable for burning in lamps in which the oil is kept at the same level, and which are provided with a double current of air, with a chimney, and proper burner; 3, a heavier oil adapted for lubricating machinery; 4, a red coloring matter extracted from the different varieties of the oils; 5, paraffine; 6, a grease for lubricating machinery, being evidently a mixture of paraffine in little oil; 7, a black pitch, the residue of the distillation, suitable for coating wood, metals, &c., for their preservation; 8, an alkaline soap prepared by treating the oil with alkalies; 9, sulphate of ammonia; 10, fertilizing mixtures prepared with the ammoniacal liquors; 11, sulphate of alumina. The crude oil obtained from his retorts, which were like those of the gas works, he treated either before or after its being redistilled with a quantity of acid (sulphuric, muriatic, or nitric), and caused the mixture to be thoroughly agitated. This operation being continued for some time, the tarry matters are partially freed from the oil, and on the mixture being left to repose they subside with the acid, so that the purified oil can be drawn off from the top, bringing with it but little of the acid. This is neutralized by addition of an alkali, as the lye of soap boilers, and after the mixture has been well agitated again, more tar and coloring matter subsides, from which the oils are separated by decanting again and redistilling. By a series of fractional distillations the several sorts of light oils are obtained in a pure state.—In England, and incidentally in the United States also, the establishment of the coal oil manufacture is due to the enterprise of James Young, Esq., of Glasgow. In 1847 his attention was directed to the extraction of a lubricating oil from petroleum, that exuded from a coal mine in Derbyshire; and having exhausted the supply of this, he next applied to the same purpose the Torbanehill mineral or Boghead cannel, a material which was first ascertained in 1850 to possess an unusual proportion of bitumen, and to be capable of affording large quan-

tities of gas. (See Coal.) Mr. Young found it still better adapted for the manufacture of oil, and succeeded so well in this enterprise that in the year 1854, as he testified in a lawsuit for establishing his patent, his production of oil amounted to about 8,000 gallons a week, which sold for 5*s.* a gallon. For the year the sales reached about £100,000, a large proportion of which was profit. Such success soon led others to undertake the same branch of manufacture, and coal oil works rapidly increased in England, and were introduced into the United States. The first factory of the kind in this country was that of the kerosene oil company, on Newtown creek, Long island, opposite the upper part of New York city, which went into operation in June, 1854. It was designed to work the Boghead cannel or other materials of similar character that might be brought to New York from New Brunswick or Nova Scotia, or from the western coal mines; and the operations were to be conducted under the patent of Mr. Young granted to him in this country, as well as in England, for the exclusive use of coal for this manufacture. His claim, however, was not recognized at other works of later date in the United States, and was never enforced. In 1856 the Breckenridge coal oil works at Cloverport, Ky., on the Ohio river, were producing oil from the cannel coal of the vicinity, which somewhat resembled the Boghead cannel in appearance and in its rich bituminous character; and the same year a factory was built in Perry co., Ohio. The cannel coals of this region proving to be well adapted for this application, several other factories were soon constructed, particularly in the vicinity of Newark, Licking co., Canfield, Mahoning co., and in Coshocton co.; and at the close of the year 1860 the total number in Ohio was probably not less than 25, the working capacity of which might average 300 gallons of light oils a day each. At the same time there were 6 or more factories in Kentucky; one in St. Louis, Mo.; 8 or 10 in Virginia, mostly in the Kanawha region, except a few near Wheeling; about 10 in western Pennsylvania; 5 in the environs of New York city; one at Hartford, Conn.; 4 in and about Boston; one in New Bedford; and one in Portland, Me. The coals employed in these works were found to differ greatly in their capacity of producing oil; and none of them were so valuable in this respect as the Boghead cannel. From this it was found possible to extract 130 gallons of crude oil, yielding about 75 gallons of refined oil, per ton; the usual product, however, is about 117 gallons of crude and 60 of rectified oil. The maximum yield of the Albert coal of New Brunswick is 110 gallons of crude and about 75 of rectified oil; of the Breckenridge coal and the cannel coals of Virginia from 90 to 100 gallons of crude and 50 to 60 of rectified oil; of those of Ohio from 55 to 87 gallons of crude oil; and of those of Beaver co., Penn., from 45 to 55 gallons crude oil.—The processes pursued in the different works are essentially the same. The only distinctions of importance are in the forms of the apparatus, and particularly in the retorts. The common form in use for some time was that of the gas retorts—long cast iron boxes, with an opening at the end, that projected from the furnace in which they were set, and shaped in their section like the letter ⌓. Others were made of cylindrical form, were set upright in the furnace, made to be charged at the top and discharged at the bottom, and furnished with exit pipes for the volatile products either at the top or at different heights. Earthenware retorts have been substituted in some works for those of cast iron, as in the manufacture of gas. In the use of all of them a loss results from the unequal degree in which portions of the charge are heated, a part being rapidly overheated so as to produce gaseous matters, while other parts are acquiring the heat necessary for the generation of the oily products. To correct this defect a form of retort was invented in France in the early periods of the manufacture, called the revolving retort. This was a cast iron cylinder, which as now used is about 8 feet long and 6 feet in diameter, suspended in the furnace upon an axle in the centre of each end and made by machinery to turn slowly over while the charge is heating, usually about two revolutions in a minute. The volatile products find their way out to the condensers through the axle at one end, which is made hollow for this purpose. The charge is introduced through a man hole in the front end. For a large retort it may amount to 2½ tons of coal. This is distilled in 6 hours, and the carbonaceous residue and ash being drawn out a new charge is immediately introduced. By keeping the retort at a temperature below redness, the operation goes on rapidly with great uniformity and with the largest production of oil. Such retorts, however, are costly to construct, are more liable to get out of order than the fixed retorts, and it is also objected to them that the coal is more or less ground to powder, which in the condition of dust is carried off by the vapors, obstructing the condensers and adding to the cost of the purification. Methods of distillation are also in use by which an external fire is dispensed with, and the heat required for the expulsion of the volatile matters is produced by the combustion of a portion of the material, as in the process of charring wood for charcoal, and coal in pits and kilns for coke. Near Wheeling, Va., this plan is in operation, the coal being collected in pits to the amount of 100 tons at a charge, and covered with earth. The fire is started at one end, and a draught through the piles is produced by the exhausting action of a jet of steam applied in the outlet pipe at the opposite end. A draught is also produced at other places where this method is adopted by means of a tall chimney, between which and the pits the vapors pass through the condensers. An ingenious form of kiln was invented and introduced in 1859 at the kerosene oil works, by Mr. Luther Atwood. This is of circular form, resembling a lime kiln 20 feet high and 12 feet in diameter inside, open at the top, and of the capacity of over 25 tons of material. It is built of common brick and lined with fire brick. The charge of Boghead cannel being introduced, it is covered with about 4 tons of Cumberland coal and a quantity of pine wood. This is then set on fire, and at the same time a jet of steam is let into the eduction pipe which proceeds from the bottom of the kiln. A downward draught is thus produced, which is regulated and controlled by attention to the steam jet. The process is thus conducted as slowly or rapidly, with as much or little heat, as may be required, and most of this is produced at the expense of the cheaper Cumberland coal, in the combustion of which the oxygen of the air is consumed, so that little of it reaches and wastes the cannel below. About 4 days are required for completing the distillation. At the end of this time the charge has settled down, leaving in the bottom some unconsumed coal and incombustible ashy residuum. The kerosene company have 18 of these kilns at their works, and one beside of the capacity of 100 tons. The vapors from the retorts or kilns are conducted first into condensers, of which various forms are in use. Those of the kerosene oil company (to whose works the following description is more particularly applicable) are tall cylinders of boiler-plate iron, standing several of them together. Through these the vapors pass in succession, and as they are condensed the liquid products trickle down their sides, and are thence conducted into vats made of iron and set in the ground, while the gases escape from a chimney connected with the last of the condensers. Being inflammable like the coal gas, they may be applied to similar purposes, or they may be conducted into gasholders and burned under the stills for fuel. In the vats a partial separation takes place of oil and water, the former rising to the surface and flowing over into a conduit leading to a large reservoir in the ground of the capacity of about 40,000 gallons. The water settling beneath the oil would soon fill the vat, but for an ingenious arrangement, by which it is also continually discharged. This is a bent pipe with a long and short limb like a siphon, but used like a siphon inverted. It is put over the edge of the vat, the long limb inside reaching near the bottom, and the short one terminating outside a little below the level of the surface of the oil. The pipe being once filled, the water continues to flow up through it, and is received into the second vat, where, as it brings some oil with it, the same method of separation is repeated, and so it may be through several others. The liquid is finally collected into a large cistern, and upon the surface some oil still collects, which is saved by occasional skimming. From this cistern the waters with the ammoniacal products of the distillation are allowed to escape.—The crude oil collected in the great reservoir is like the natural petroleum, and the subsequent treatment of purification is the same for both. It is pumped out into the first set of stills, which at the works referred to are 18 in number, each one of the capacity of 1,500 gallons. They are made of cast or boiler-plate iron, with bottoms of cast iron 2 inches thick. Even this great thickness does not insure their stability, the iron soon becoming warped and finally cracking from the effects of the heat. The fires beneath them are of anthracite and of a remarkably dense coke, which in the distillation accumulates on the bottom of the still, the carbonaceous particles separating from the oil and forming an incrustation of 8 or 10 inches in thickness. The contents of the still are worked off in 24 hours, the temperature gradually rising up to 600° or 800° F. From the head of the still the vapors pass through the worm of the condenser, which, in the latter part of the distillation, is not allowed to cool down sufficiently for the paraffine to condense in it, as this might by causing obstruction endanger the explosion of the still itself; but by proper regulation of the fire and condenser a steady flow of the oil goes on from the end of the worm. The quantity obtained is within 10 or 12 per cent. of that introduced into the stills; and though freed of this amount of impurities, the oil is still of a greenish hue, and retains more or less of its disagreeable odor. The next process is the chemical treatment with sulphuric acid. The oil is transferred to large cylindrical cisterns, called agitators, of the capacity of 2,000 gallons each, and 5 or 6 per cent. of sulphuric acid being added to it, the mixture is swept rapidly round by the revolution of stirrers in the tub moved by machinery. This having been kept up for some time and the mixture being left some hours to repose, a considerable part of the impurities settle with the acid to the bottom, from which they are drawn off, leaving the partially purified oil in the upper part of the cisterns with some acid and impurities still adhering to it. These are mostly removed by agitating again with water, and again after a repose of some hours drawing off the matters that have collected in the bottom. After this a strong lye of potash or of soda is introduced into the oil in the agitator, and the stirring is repeated with this; and the sediments being drawn off the washing is repeated, when the oil is ready for the second set of stills. This method of purification, called the "cold" treatment, may be advantageously varied by heating the oils. The second stills are of the same number and capacity as the first set. The first product of this distillation is a very light oil which, if at first somewhat discolored, is soon succeeded by a limpid oil that continues with little variation, except that it gradually becomes heavier. This is the merchantable illuminating oil, and includes all that portion of the distillate below the specific gravity of 0.820. Its proportion is very variable in the different oils, in some of the best natural oils amounting to 80 or even 90 per cent., and in others not exceeding 30 per cent. The products which succeed this are the heavy oils for lubricating, which pass into the last product of dark-colored heavy oils containing the paraffine. The heavy oils may be made to yield, by means of fractional distillations, the last portions of the light oils they still contain, and the heaviest portions may then be made to give up a considerable part of the paraffine by leaving the liquid in tanks exposed to a temperature as cold as may be. The paraffine condenses in bright silvery scales, and is recovered by drawing off the oil and then subjecting it to heavy pressure. It is purified by successive applications of sulphuric acid, hot water, and alkalies. From the agitators there finally proceeds a residuum of tarry matters mixed with those portions of the chemical ingredients that were introduced; these, and the alkaline impurities from the stills, are allowed to run to waste, the alkalies only having been economically recovered at one or two establishments. The illuminating oils may be almost entirely freed from the odor they possess by standing several days over alkaline solutions in shallow cisterns; and by exposure to light in open vessels the color they retain is also partially removed; but although the perfectly clear and colorless oils are greatly preferred in the market, even at 75 cents per gallon when the oils of a slightly yellow color will hardly sell at 60 cents, the latter in reality possess a greater illuminating power and are consequently worth more to the consumer than the perfectly limpid oils.—Of the materials now employed for lamps, the coal oils, on the considerations of safety, economy, and the brilliancy of the light they afford, are to be preferred to all others. The chief obstacle at present to their general use is the necessity of employing a chimney to effect a thorough combustion of the vapors as they pass from the wick, and thus insure a flame free from smoke. Encumbered with this appendage, the lamps themselves are more expensive than those designed for other fuel, and this with the inconvenience attending their use has prevented many from adopting this mode of illumination.

PETRONIUS ARBITER, the name prefixed to the fragments of a Latin composition entitled *Petronii Arbitri Satyricon*, which consists of a prose narrative interspersed with a few poems. It describes the adventures of several young debauchees in the south of Italy, particularly Naples and its environs. Parts of the dialogues and descriptions are of an obscene character, although the style is deemed elegant and the language classical. The most important section is called the "Supper of Trimalchio," and gives an account of the banquet of a wealthy gourmand; next to this in interest is the tale of the "Ephesian Matron." The longest section in verse is a poem on the civil war, amounting to 295 hexameter lines. Scholars have variously placed the date of the author from the last years of Augustus to the reign of Constantine the Great. By many it has been maintained that he was the Petronius referred to by Tacitus (*Ann.* xvi. 18, 19) as the most elegant voluptuary of the days of Nero, the *arbiter elegantiæ* of that monarch, and director of his pleasures. His life being threatened by the jealousy of Tigellinus, he opened his veins, and, occasionally checking the flow of blood by bandages, sank so gradually that his death seemed to be the result of natural causes. In his last moments he is said to have sent to Nero a sealed document, giving an account of the excesses and debaucheries of the emperor, and taunting him with them. The first separate edition of Petronius Arbiter was printed at Venice in 1499. The best is that of Burmann (2 vols. 4to., Amsterdam, 1743). There are English translations in Bohn's "Classical Library."

PETROPAVLOVSK. I. A town of Asiatic Russia, situated on the bay of Awatska, on the S. E. coast of the peninsula of Kamtchatka, in lat. 53° 1′ N., long. 158° 43′ E.; pop. about 1,000. It is the capital and principal military station of the province of Kamtchatka. The harbor is good, has a lighthouse, and is defended by 2 forts. A few vegetables are raised; but fish is the great article of produce, and is dried in large quantities for exportation. A British squadron bombarded Petropavlovsk in Sept. 1854. II. A town of Russia in Asia, in the government of Tobolsk, situated on the river Ishim, 190 m. W. from Omsk, on the great post road of Siberia; pop. about 4,000. It is an important military post. A large trade is carried on with other parts of Siberia, Toorkistan, and the W. part of China, Petropavlovsk being a station for the caravans from Bokhara, Khiva, and the Kirghis steppe, and one of the principal commercial entrepots between European Russia and central Asia.

PETROZAVODSK, a fortified town of Russia, capital of the government of Olonetz, situated on the Lossolenka, where it falls into Lake Onega, 192 m. N. E. of St. Petersburg; pop. about 8,000. It contains 6 churches, schools, an imperial cannon foundery, 2 extensive docks for lake vessels, and manufactories. Three thousand tons of iron, considered the best in Europe, are annually produced here.

PETRUS LOMBARDUS. See LOMBARD, PETER.

PETTIS, a central co. of Mo., drained by La Mine river and branches; area, about 600 sq. m.; pop. in 1860, 9,492, of whom 1,982 were slaves. It has an undulating surface, with extensive prairies and forests of timber, and the soil is fertile. The productions in 1850 were 519,439 bushels of Indian corn, 89,915 of oats, 20,000 of wheat, 1,244 tons of hay, 25,516 lbs. of wool, and 61,898 of butter. There were 5 grist mills, 8 saw mills, 2 tanneries, 15 churches, and 700 pupils attending public schools. Capital, Georgetown.

PEWEE, a name given to several species of American flycatchers of the sub-family *tyranninæ*. The common pewee, or Phœbe bird (*sayornis fuscus*, Bonap.), is 7 inches long and 9⅓ in alar extent; the general color of the plumage is dull olive brown above, darkest on the head, and yellowish white below; quills brown, most of the wing feathers edged with dull white; tail forked, the outer edge of the lateral feather dull white; bill and feet black. This lively species is found throughout eastern North America, from Newfoundland to Florida. In the middle states it arrives from the south early in April, and gets out a first brood by the middle of May, and a second by the beginning of August; it leaves again for the south in October, migrating by night. The nest resembles that of the barn swallow, being made of mud, grasses, and moss, lined with softer materials, and attached to a rock, wall, or rafter; they repair the same nest year after year; the eggs, 4 to 6, are white, with a few reddish spots at the larger end; the young are hatched out on the 13th day, and leave the nest in 16 more; the parents show great affection for them, snapping the bill and darting boldly toward all intruders. Its flight is rapid, with frequent sailings; it is fond of vibrating the tail, erecting the crest, and making a tremulous motion with the wings; it feeds on insects, which it takes with great dexterity and rapidity on the wing, swallowing them whole, and ejecting the hard parts like the swallows and goatsuckers.—The wood pewee (*contopus virens*, Cab.) is 6⅓ inches long, and 10¾ in extent of wings; the general color above is brownish olive, brownish black on the head; 2 pale grayish bands across the wings; a narrow white circle around the eyes; greenish yellow below, with a grayish tinge on the throat and breast. It is fond of the most gloomy forests, but is sometimes seen in shady orchards, and in the autumn near the edges of still ponds surrounded by woods. The flight is swift, with sudden sweeps in pursuit of its insect prey; it seizes with certainty moths and other nocturnal insects when it is very dark; it feeds sometimes also on berries. Its notes are low, mellow, and sweetly melancholy when in its favorite haunts; its common name, like that of others of the sub-family, is derived from its utterance of the syllables "pe-wee," singly or repeated, as Audubon says like what one might imagine to be the prolonged "last sighs of a despondent lover." It reaches the middle states about the 10th of May, going as far north as New Brunswick, south to New Granada, and west as far as the high central plains. The nest is delicate in form and structure, covered by lichens, and so apparently a part of the branch to which it is attached as to be detected with difficulty; the eggs are 4 or 5, light yellowish, with reddish spots at the larger end; in the middle states 2 broods are raised in a season; it boldly attacks man, beast, or bird approaching its nest.—Many other dark-colored flycatchers are called "pewee" in various parts of the country; as, for instance, the short-legged pewee (*C. Richardsonii*, Cab.), much resembling the last species, and found on the western coast of North America.

PEWIT, a name applied to the lapwing plover (*vanellus cristatus*, Meyer), and sometimes in Great Britain to the black-headed gull (*larus ridibundus*, Linn.), and in America to the pewee.

PEWTER, an alloy variously composed of different metals. Tin and lead are commonly used, but in no regular proportions. To these other metals are occasionally added, as a little copper, which makes the alloy harder and sonorous; antimony to harden and give a silvery lustre; and zinc, which is said to cleanse the alloy. The last is sometimes introduced in a strip of half zinc and half tin, which is used to stir the melted metals; and sometimes a lump of zinc is allowed to float upon the surface during the casting, its fumes probably protecting the metals beneath from the oxidizing action of the air. The inferior sorts of pewter contain the most lead, some having full half their weight of this metal; the alloy is dull and soft and of bluish shade. The best pewters contain only ⅓ or ⅙ of lead, the remainder being tin; they appear like tin, and are used for plates and dishes. A pewter of 82 parts tin and 18 lead is sanctioned by the French government for vessels to contain wine or vinegar. This has a specific gravity of 7.764; a greater density indicates a larger proportion of lead. Pewter has been largely employed for domestic utensils, as plates, mugs, spoons, &c.; and it is used by lapidaries for polishers and laps. Sheets of it serve for cheap engraving, as of music, the notes being stamped upon the alloy instead of the more costly method of engraving with the burin.

PEYRONNET, CHARLES IGNACE, comte de, a French statesman, born in Bordeaux in 1775, died in Jan. 1854. His father, an attorney of the parliament of Guienne, had been ennobled, and suffered death by the guillotine during the revolution. Charles withdrew from France, but returned after the 9th Thermidor, and in 1796 was admitted to the bar in his native city. He was better known by his licentious life and many duels than his standing in the profession. In 1814 he figured among the royalist partisans who called in the English and proclaimed the Bourbons. In 1815, being a captain in the national guard, he evinced respect and devotion to the duchess of Angoulême, on her flight to England; and his conduct was rewarded on the second restoration by his appointment as president of the civil tribunal of Bordeaux. In 1818 he was promoted to the post of attorney-general at Bourges, was elected from that city to the chamber of deputies, and was chosen in 1820 to assist in the prosecution before the court of peers of the imperialist conspirators, where he distinguished himself so much as to be rewarded the next year with the portfolio of minister of justice in the Villèle cabinet. During his 7 years' tenure of office, he proved an uncompromising supporter, if not the prime mover, of all the reactionary measures proposed or adopted. In 1822 he proposed the law for the restriction of the freedom of the press; in 1823 advocated the armed intervention in Spain; in 1824 procured the reëstablishment of the censorship; in 1825 caused the adoption of the law against sacrilege; in 1826 attempted to have the right of primogeniture restored; and in 1827 tried to restrict the press still more, dissolved the national guard, and altered the jury law. The elections of 1828 obliged Charles X. to dismiss the Villèle cabinet; but in 1830 Peyronnet became minister of the interior under the premiership of Polignac. He signed the royal ordinances of July 25, which brought about the revolution, although he is said to have disapproved of them. After the outbreak he was arrested at Tours when trying to escape, was taken to Vincennes, arraigned with his colleagues before the court of peers, sentenced to perpetual imprisonment, and incarcerated in the castle of Ham, where he wrote a *Histoire des Francs* (2 vols. 8vo., 1835). Released after 6 years, he retired to private life.

PFEFFEL, Gottlieb Konrad, a German poet and fabulist, born in Colmar, June 28, 1736, died there, May 1, 1809. At the university of Halle he pursued the study of law, and while there in 1757 lost his sight, which he never regained. In 1773, with the assent of the king of France, he founded an academy for the purpose of teaching the Protestant youth in Colmar. This the French revolution broke up, and henceforth he applied himself to literary occupations. In 1803 he became president of the newly founded evangelical consistory in Colmar. His "Poetic Essays" fill 10 volumes (new ed., Tübingen, 1802–'10), and his "Prose Essays" the same number (Tübingen, 1810–'13).

PFEIFFER, Ida, a German traveller, born in Vienna in 1795, died there, Oct. 27, 1858. Her maiden name was Reyer. From childhood she had a great curiosity to see foreign countries, but it was not until she had reached the age of 47 that, her husband being dead and her two sons established in life, she was enabled, with a small sum saved from her narrow income during 20 years, to undertake a journey to Palestine. She left Vienna in March, 1842, and after visiting Constantinople, Broussa, Beyrout, the chief places of the Holy Land, Egypt, the Red sea, Malta, Sicily, Naples, and Rome, reached home again in December of the same year, and published her journal under the title of a "Journey of a Vienna Woman in the Holy Land" (2 vols. 12mo., 1844). A tour through Norway, Lapland, and Iceland in 1845 afforded material for her narrative of a "Journey to the North of Scandinavia and Iceland" (2 vols. 12mo., Pesth, 1846). On June 29, 1846, she sailed from Hamburg in a Danish brig on a voyage round the world, accompanied by Count Berchthold, from whom, however, she subsequently parted company, finding that his strength and spirits were not equal to her own. They landed at Rio de Janeiro in September, intending to cross the South American continent to the Pacific. This plan, however, they could not carry out. In one of their excursions into the interior they were attacked by a negro armed with a lasso and long knife, but defended themselves with two parasols and a jack-knife until assistance arrived. Both travellers were wounded, but Madame Pfeiffer was soon recovered sufficiently to visit, with a single guide, the Puri Indians, whom she joined in a great parrot and monkey hunt. Taking ship again from Rio de Janeiro to Valparaiso, she made a short stay in Chili, and then went in a Dutch vessel to Macao, touching on the way at Tahiti, where she spent a fortnight. From China she went to Calcutta, and thence overland to Bombay, performing about half of the journey, for the sake of economy, in an ox cart. An English steamer conveyed her from Bombay to Muscat, Bushire, and Bassorah, whence she sailed up the Tigris to Bagdad, and after a little more than a month's residence there proceeded by caravan to Mosul, and thence to Ooroomeeyah in Persia, where she arrived after a journey of extraordinary privation and danger. In a similar manner she reached Tabriz and Erivan, travelled thence to Redout-Kalé on the E. shore of the Black sea, and there taking the steamer visited Kertch, Sebastopol, Odessa, Constantinople, Smyrna, Athens, and Trieste, and reached Vienna Nov. 4, 1848, having made the circuit of the globe in 2 years and 4 months. Her journal was published under the title of "A Woman's Journey round the World" (3 vols. 12mo., Vienna, 1850). In April, 1851, the Austrian government having given her $500 toward the expenses of another voyage, she visited London, and sailed from the Thames in May for the Cape of Good Hope, hoping to penetrate into the interior of Africa and reach Lake Ngami; but finding the cost of such an expedition beyond her means, she went to Borneo, Java, Sumatra, Celebes, Banda, Ceram, and Ternate, fearlessly making long excursions among the dangerous tribes of the interior of some of these islands; and in July, 1853, she accepted a free passage which was offered her by an American captain from Batavia to San Francisco. She spent 3½ months in California, and then proceeded by steamer to Panama and Callao, crossed the Andes to the sources of the Amazon, returned to Panama, traversed the isthmus, sailed for New Orleans, ascended the Mississippi as far as the falls of St. Anthony, visited the great lakes and the falls of Niagara, the St. Lawrence, Montreal, Quebec, Lake Champlain, the Hudson river, and New York, and on Nov. 10, 1854, took the steamer to Liverpool. She passed a few months of the following year with one of her sons at St. Michael, one of the Azores, and then returned to Vienna, where her "Second Voyage round the World" appeared in 1856. Her last expedition was to the island of Madagascar, where she arrived in 1857, in company with a Frenchman who was soon arrested for a conspiracy to dethrone the queen, and ordered with his companion to depart from the island. Madame Pfeiffer returned home with a fever which ultimately caused her death. Her books have been translated into English and widely read. The haste with which her journeys were prosecuted renders them of little use as works of information, and they owe their chief interest to the remarkable circumstances in which they originated, and as records of womanly courage and perseverance under almost insuperable difficulties. Madame Pfeiffer was generally unaccompanied except by a hired guide, and ignorant of the languages of the people whom she visited. Her means were extremely narrow, and she was greatly indebted to the liberality of the English and Dutch colonial governments, and the proprietors of railroad and steamboat lines in the United States.

PFEIFFER, Louis Georg Karl, a German naturalist and physician, born in Cassel, July 4, 1805. He served as a surgeon in the Polish patriot army in 1831, and then devoted his attention to the study of natural history, travelled through a part of the Netherlands and Germany, and in 1838 visited Cuba. He has written extensively on subjects of natural history.

PFISTER, Albrecht, a printer of the 15th century, born about 1420, died about 1470. He was a card painter in Bamberg, but about 1455 began to print with movable types. It is doubtful whether he hit upon the invention independently, or learned it as an assistant of Gutenberg. The types of Pfister, although they have some similarity to Gutenberg's, are still peculiar. He began with the printing of school and prayer books, and fragments of Latin grammars of his work have lasted to our time. Among his productions were indulgences printed with metal types of the years 1454 and 1455, an almanac of 1457, and a *Biblia Pauperum*. His great work, however, is the Latin 36-line Bible in 3 vols. folio, and consisting of 881 leaves.

PFIZER, Gustav, a German lyric poet and critic, born in Stuttgart, July 29, 1807. He was educated at the gymnasium of his native place, studied in 1825–'30 at Tübingen, and in 1846 was made professor in the Stuttgart gymnasium. He first attracted attention by the publication of a volume of poems (Stuttgart, 1831). A second volume appeared in 1835. He also wrote "The Life of Martin Luther" (1836); a larger poem, entitled "The Foreigner and the German, Æneas Sylvius Piccolomini and Gregory of Heimburg, Historico-Poetic Forms of the 15th Century" (1844); and "History of Alexander the Great for the Use of Youth" (1847). He has been connected with various literary journals, and has written critical essays on Uhland, Rückert, and Heine.

PHÆDO, or Phædon, a Greek philosopher who flourished about the beginning of the 4th century B. C. He was a native of Elis and of noble birth, but, becoming a prisoner of war about 400 B. C., was brought to Athens and sold as a slave. He obtained his release through the efforts of Socrates, and was thereafter one of the most devoted adherents of that philosopher. Plato introduces him as the principal interlocutor in his dialogue on the death of Socrates. Phædo finally returned to Elis, and became the founder of the Elean school of philosophy.

PHÆDRA, in Greek legendary history, the wife of Theseus and daughter of Minos, king of Crete, and of Pasiphaë, and sister of Ariadne. Her stepson, Hippolytus, with whom she had fallen in love, refusing to gratify her passion, she accused him to his father of an attempt upon her honor. Theseus hereupon cursed his son, and asked Neptune to destroy him, which prayer the god complied with. When the innocence of Hippolytus became known, Phædra hanged herself, or according to some was put to death by her husband. The story of Phædra was the subject of tragedies by Sophocles and Euripides, now lost. Racine also wrote a tragedy on it.

PHÆDRUS, a Latin fabulist of the Augustan age. He was originally a slave, and was brought from Thrace or Macedonia to Rome, where he mastered the Latin language, and was freed by Augustus, who patronized him. He wrote 97 fables in iambic verse distributed in 5 books, and states in the prologue to the first book that he has simply turned the matter of Æsop's fables into poetry. In many cases, however, he has borrowed nothing from his model, as he refers to historical events of a later period. With the exception of a probable allusion by Martial in one of his epigrams (iii. 20), Phædrus is first mentioned by Avienus. The manuscripts of his fables are rare. The first edition was printed by P. Pithow (12mo., 1596), from a manuscript called the Rosamboanus, from the name of its owner, and supposed to date from the 10th century. The latest and only critical edition is that of J. C. Orelli (8vo., Zürich, 1831). Perotti, archbishop of Manfredonia, in the middle of the 15th century, made a collection of fables from Phædrus, Avienus, and others, among which were 32 not included in the usual editions of Phædrus; they were first published at Naples in 1809 by Cassiti, as a 6th book of Phædrus, but their genuineness has been much doubted.

PHAËTON, or Phaëthon (Gr. Φαεθων, the shining), in Greek mythology, the son of Helios (the sun) and the Oceanid Clymene. To satisfy those who doubted whether the sun was his father, he obtained from Helios an imprudent promise that he would grant him any favor he asked, and thereupon demanded permission to drive his chariot across the heavens. The celestial horses, despising their weak driver, turned out of their path, blackening the Ethiopians to the left by the near approach of the sun: and when the chariot went over to the right, so near to the earth as almost to set it on fire, Jupiter killed Phaëton with a thunderbolt and hurled him into the Eridanus (Po). His sisters, the Heliades, who found him lifeless, were changed into poplars and their tears into amber.

PHALANGER, a genus of marsupial mammals, the type of the family of *phalangistidæ*, so called from having the 2d and 3d toes of the hind foot united in a common integument. They are expert climbers, dwelling upon trees, and eating leaves, buds, fruits, and occasionally small birds, mammals, and insects; they keep concealed during the day on the branches or in the hollows of trees, quitting their hiding places at twilight; they are rather sluggish in their movements, except such as are provided with a flying membrane. The head is moderate, the face short, the upper lip cleft, and the muffle naked; limbs equal in length, all 5-toed, the anterior with compressed and curved claws, the posterior with the inner toe large, nailless, at right angles and opposable to the rest; the tail long, and generally prehensile; the pouch well developed; the eyes large; the stomach simple, and the cæcum largely developed. Of the genera composing this family, *phascolarctos* (De Blainv.) has been noticed under KOALA; the others are *phalangista* (Cuv.) and *petaurus* (Shaw).—In *phalangista* the teeth are: incisors $\frac{6}{2}$, canines $\frac{1-1}{0-0}$, premolars $\frac{2-2}{1-1}$, true molars $\frac{4-4}{4-4}$; the anterior upper pair of incisors are larger and longer than the rest, and the large lower incisors are nearly horizontal; the small teeth between the incisors and molars are not constant even on both sides of the jaws of the same individual, but in most the true molars are $\frac{4-4}{4-4}$; the tail is prehensile. The genus has been subdivided into 4 sub-genera. In the sub-genus *cuscus* the basal portion only of the tail is covered with hair; the ears short, almost hidden by the fur; eyes with vertical pupil; the fur is dense and rather woolly, and the apical part of the tail bare, with numerous fleshy tubercles. They are about the size of a domestic cat, and are confined to the islands of the Indian and Australian archipelagos. The ursine phalanger (*P.* [*C.*] *ursina*, Temm.) is of a general black color, freckled with yellow, under parts dirty yellow, and iris orange red; it is about 20 inches to the root of the tail, the latter being 19; they live in thick woods; the very fat flesh of this, as of other species, is much relished by the natives, and the teeth are used as ornaments; some of the species emit a fetid odor from the anal glands. In the sub-genus *trichosurus* the tail is densely clothed with fur, with the exception of a part of the under surface; ears distinct and usually long; they inhabit Australia; the fur is longer and looser than in the northern islands. The vulpine phalanger (*P.* [*T.*] *vulpina*, Desm.) is of a general grayish color, yellowish white below, with the muzzle and chin blackish, the feet tinged with brown, the tail bushy and black except at the base, and an oblong rusty patch on the chest; it is as large as a cat, with long, pointed, fox-like ears and nose, and numerous long black moustaches; in captivity it usually sleeps in the daytime, and takes its food between the hands like a squirrel; the prehensile tail assists it in climbing. In the sub-genus *pseudochirus*, the 2 inner toes of the fore foot are separated from and opposable to the other 3; the tail is covered with short hairs except at the tip; the ears short and round. Cook's phalanger (*P.* [*Ps.*] *Cookii*, Desm.) has long and soft fur, gray above and yellowish white below, with the sides and outer surface of limbs tinged with bright rusty; it is about 2 feet long, of which the tail is 1 foot; it inhabits New South Wales. In the sub-genus *dromicia* the ears are moderate and nearly naked, the nails small, and the tail clothed with small hairs, but naked at the end beneath; they resemble dormice in size, appearance, and some of their habits. The dormouse phalanger (*P.* [*D.*] *nana*, Geoffr.) has a very soft fur, of an ashy gray above tinged with pale reddish brown; under parts white, with rusty yellow shade on the chest; it inhabits Tasmania, and is 7½ inches long, of which the tail is one half. These are lively at night, sluggish by day, fat, feeding on nuts and similar substances, which they hold between the fore paws; they are harmless and gentle, but not affectionate; they are very fond of the blossoms of the *Banksia;* they hibernate in winter, like, but not to the same degree as, the dormouse. Specimens of these, and of several other species, have been seen living at the London zoological gardens.—The genus *petaurus* includes the flying phalangers, which have a membrane extended from the fore to the hind legs; the tail is very long, and well clothed with hair; they resemble flying squirrels in appearance and habits. The flying phalanger (*P. taguanoides*, Desm.) has broad, short, and rounded ears, densely hairy externally; the membrane extends to the elbow; the tail is cylindrical, longer than the head and body; fur long and soft; general color above brownish black, pencilled with whitish on the flanks, the under parts impure white, and the tail black; the length of the body is 20, and of the tail 22 inches. It inhabits New South Wales, is nocturnal, and feeds on flowers of gum trees, and on insects and honey contained therein; it is an expert climber, and rarely descends to the ground. Some of the smaller species, as the sugar or Norfolk island flying squirrel (*P. sciureus*, Desm.), are hunted for their fur, which is used for the same purposes as chinchilla. In flying powers they are equal to the flying squirrels. For other genera and species, and full details, the reader is referred to vol. i. of Waterhouse's "Natural History of the Mammalia."

PHALANX. See INFANTRY, vol. ix. p. 512.

PHALARIS, tyrant of Agrigentum in Sicily, probably from 570 to 555 B. C. He was a native of Agrigentum, or according to some of Astypalæa in the Ægæan sea, and acquired the supreme power by a stratagem. The early part of his reign was mild, and he is said to have been led to the career of cruelty and oppression for which his name has become notorious by the unwillingness of the people to submit to his authority. It is related that Perillus, an Athenian artist, constructed for him a brazen bull in which his victims were roasted, and the first sufferer by the machine was the maker himself. Athenæus speaks of his roasting children alive, and Aristotle says that he ate them. His misgovernment at last caused a popular outbreak, in which he was stoned to death. The stories of his cruelty are probably much exaggerated, and in the later Greek writers he appears as an admirer and patron of literature and philosophy. The "Epistles of Phalaris," which were first mentioned by Stobæus, and were first published at Venice in 1498, were long believed to be the productions of this tyrant; but their spuriousness was thoroughly exposed by Bentley. They are believed to be the work of a Greek writer of the age of the Cæsars. They have gone through several editions, and have been translated into English and other modern languages.

PHALAROPE, a family of wading birds, coming near the snipes, embracing the genus *phalaropus* (Briss.), subdivided into 3 by modern naturalists. In this family the bill is as long as or longer than the head, slender, straight, somewhat enlarged and depressed at the tip, which is curved and acute, the nostrils situated in the lengthened groove of the sides; wings long and pointed, the 1st and 2d quills equal and longest; tail short and rounded; tarsi as long as the middle toe, strong and compressed; toes long, the lateral united to the middle by a membrane running along the border of each, and more or less lobed as in the coot; hind toe moderate and elevated, and slightly margined with membrane; claws short and sharp; feathers of the breast compact and duck-like. These birds live in the northern regions, migrating south in severe winters; they are generally seen in pairs or small parties, swimming on the sea, lakes, ponds, and fresh water streams, usually near the margin, searching for floating seeds, aquatic insects, and small crustaceans; large beds of floating sea weed are their favorite resorts; they are excellent swimmers, though they do not dive, and high and rapid fliers; they lay 3 or 4 eggs in a tuft of grass in marshes. Wilson's or the gray phalarope (*P. Wilsonii*, Sab.; genus *steganopus*, Vieill.) is about 9½ inches long, with an alar extent of 17; the bill 1¼ inches, black; general color above ashy gray mixed with reddish; stripe behind eye reddish black; front of neck reddish brown; rump and upper tail coverts and under parts white; the young are cinereous above, mixed with dark brown, and ashy white below. It is found throughout the temperate regions of North and South America, on the Atlantic and Pacific coasts, and sometimes wanders to Europe; it is fond of wading as it searches for food, and is a lively and graceful bird; the marginal membrane of the toes is nearly even. The northern phalarope (*P. hyperboreus*, Temm.; genus *lobipes*, Cuv.) is about 7 inches long, with an alar extent of 14, and the bill 1 inch; the webs are scalloped at the joints. The general color above is brownish black, paler on the rump, and mixed with ferruginous on the back; head and neck behind sooty ash, and the latter encircled with a ring of bright ferruginous, with a stripe of the same on each side; tips of greater wing coverts white; sides ashy mixed with reddish, and under parts white; the young are brownish black above, many feathers with ashy or yellowish tips. This species is found in the temperate parts of North America, and is widely distributed over N. Europe and Asia; it is one of the handsomest and most graceful of the waders. They congregate in flocks, and are very shy; they breed in the north, both sexes incubating, the female having, it is said, a bare space on the abdomen where it comes in contact with the eggs; the eggs are 1¼ by ⅞ inch, of a buff color with dark reddish brown blotches. They have been seen on floating sea weed more than 100 miles from shore. The red phalarope (*P. fulicarius*, Bonap.) is 7½ inches long and 14 in alar extent; the bill is strong and flattened, widened at the end; the head above, throat, and back brownish black, on the last edged with pale ochrey yellow; wings and tail ashy brown; tips of greater wing coverts, and stripe on cheek, white; under parts deep brownish red, tinged with purplish on the abdomen; under wing coverts and axillaries white; bill greenish yellow; the young are light cinereous above, mixed with blackish brown on the head and wings, and white below. It is found in temperate America, Asia, and Europe, and is considered excellent eating in the autumn; the eggs are 1¼ by ⅞ inch, dull greenish yellow with blotches and dots of reddish brown.

PHANARIOTES. See FANARIOTES.

PHARAOH (Egypt. *Phrah*, "the sun"), the Egyptian word for king, and applied particularly to the native rulers of Egypt before the Persian and Macedonian conquests. The title denoted that the king was an emblem of the god of light, and derived his authority directly from heaven.

PHARISEES (Heb. *perushim*, those who are separated), a sect of the Jews, mentioned first by Josephus as an established religious party during the priesthood of Jonathan, about 150 B. C., but whose origin is unknown. Their name indicated their separation from the rest of the Jews by the assumed holiness of their lives and their strict observance of religious ceremonies. In the time of Christ they were divided into two schools, that of Hillel, who represented a moderate Pharisaism, and laid the foundation of the Talmud, and that of Shammai, who demanded more austere observance. The former finally prevailed. Josephus, who was himself a Pharisee, gives the following summary of their opinions: "The Pharisees have delivered to the people a great many observances by succession from their fathers, which are not written in the law of Moses; and for that reason it is that the Sadducees reject them, and say that we are to esteem those services to be obligatory which are in the written word, but are not to observe what are derived from the tradition of our forefathers. Hence great disputes. The Sadducees are able to persuade none but the rich, and have not the populace obsequious to them; but the Pharisees have the multitude on their side." ("Antiquities," xiii. 10, 5 and 6.) "The Pharisees live meanly and despise delicacies in diet; and they follow the conduct of reason, and what that prescribes to them as good, they do. They also pay respect to such as are in years, nor are they so bold as to contradict them in any thing which they have introduced; and when they determine that all things are done by fate, they do not take away from men the freedom of acting as they think fit, since their notion is that it hath pleased God to make a constitution of things whereby what he wills is done, but so that the will of man can act virtuously or viciously. They also believe that souls have an immortal vigor in them, and that under the earth there will be rewards or punishments, according as men have lived virtuously or viciously in this life. The latter are to be detained in an everlasting prison, but the former shall have power to revive and live again; on account of which doctrine they are able greatly to persuade the body of the people; and whatsoever is done about divine worship, prayers, and sacrifices, is performed according to their directions, insomuch that the cities gave great attestation to them on account of their entire virtuous conduct." ("Antiquities," xviii. 1, 3.) In the Gospels the Pharisees appear in a much less favorable light, being the most powerful and bitter enemies of the new religion. They are represented as proud, selfish, and hypocritical. In the Talmud several classes of Pharisees are mentioned, among which were the truncated Pharisees, who hardly lifted their feet from the ground, in order to seem absorbed in meditation; and the mortar Pharisees, who wore a cap shaped like a mortar, which would only allow them to look down, and gave them an appearance of profound contemplation, and at the same time kept them from seeing women.

PHARMACY (Gr. φαρμακον, a medicine or poison), the art of choosing, collecting, preserving, and preparing medicines. Pharmacy is intimately allied with several of the natural sciences, and its successful cultivation demands an extensive knowledge of chemistry, and familiarity with chemical manipulations and with the physical properties of medicines. Rules are given in works of pharmacy for the mode and time of collecting the various roots, herbs, leaves, seeds, &c., which enter into the materia medica; but these in this country are very rarely gathered by the apothecary; most of them are of foreign origin, and those of native growth are commonly obtained from persons who devote themselves specially to their cultivation and collection. In purchasing them care should be taken that seeds are perfectly ripe, that leaves and other parts have been gathered as recently as possible, are dry, free from impurities, of a fresh, lively color, and have their characteristic smell, taste, and general appearance strongly marked. In preserving medicines, volatile and deliquescent substances should be enclosed in bottles well stopped with ground glass stoppers, leaves and flowers in tin canisters or in boxes lined with tin, zinc, or lead; hydrocyanic acid and the salts of silver should be kept in the dark, &c. —In compounding and dispensing medicines, the apothecary uses the troy pound and its subdivisions, while for other purposes drugs are bought and sold by the avoirdupois pound, 9 of which are nearly equal to 11 pounds troy. The use of two different standards of weight is a fertile source of inconvenience and confusion, and this is further complicated by the use of a fluid measure for liquids. In this latter the wine pint, containing 28.875 cubic inches, is the standard, and this is divided into 16 fluid ounces, the fluid ounce into 8 fluid drachms, and the fluid drachm into 60 minims. A fluid ounce of water at 62° F. and 30° of the barometer weighs 455½ grains, being 18 grains more than an avoirdupois, and 24½ grains less than a troy ounce.—The various operations of pharmacy have for their object to render medicines more effective and less repugnant to the taste or the stomach. They are often powdered, and numerous devices are resorted to in order to convert refractory substances into powder or to render the powder sufficiently fine; sometimes it is precipitated from a solution by a chemical reagent. Insoluble earthy substances are levigated, that is, they are moistened with water or alcohol and then rubbed with a muller upon a hard flat stone; or they are elutriated, the powder being stirred up with a large quantity of water, and a little time being allowed for the coarser particles to settle, when the water is poured off and the finely divided powder which remains floating slowly subsides to the bottom. Camphor is powdered readily by adding to it a few drops of alcohol. Some substances require to be powdered while hot, others after having been previously well dried, &c.—Extracts are formed either by first expressing the juice of certain plants by means of a screw press, or by forming solutions of their active principles by means of alcohol, ether, or water, and then evaporating to a proper consistence by means of a carefully regulated heat, and if possible with the exclusion of air. Tinctures are solutions of the active principles of medicines in alcohol, proof spirits, or ether. The active principles of certain vegetable substances are often isolated from the inert matter with which they are naturally combined, and used either pure or united with an acid to increase their solubility; for example, quinine is obtained from cinchona bark, morphine from opium, strychnine from nux vomica, and atropine from belladonna leaves. Some pharmaceutic preparations have for their object the preservation of an unstable compound; the carbonate of iron is rapidly decomposed when exposed to the atmosphere, but when united with saccharine matter it remains unchanged for a length of time. Some preparations, as pills and mixtures, have for their object convenience of administration, or the disguising of nauseous taste or odor; other medicines are adapted to particular objects, as plasters, ointments, cerates, liniments, &c. Formulas for certain preparations of widely approved activity are received into the pharmacopœia, and thus become officinal, while extemporaneous compounds ordered by the physician are called magisterial.

PHARO. See Faro.

PHAROS, the ancient name of a small island lying off the coast of Egypt, 7 stadia from the ancient Alexandria, connected with the mainland by a mole, and famous for its lighthouse, which gave the name of Pharos to all structures of a similar kind. (See Alexandria, and Lighthouse.) The island became at length a suburb of Alexandria by means of a street running along the mole, and retained some importance even to the time of Julius Cæsar, but subsequently sank into its original condition of a fishing station.

PHARSALUS (now *Phersala*), a city of Thessaly, situated in Thessaliotis, on the left bank of the Enipeus, and at the foot of Mt. Narthacius. In history it is not spoken of until after the Persian wars. In 455 B. C. it was unsuccessfully besieged by the Athenian general Myronides, after his Bœotian expedition. Through Polydamas, a native ruler, it became subject to Jason, tyrant of Pheræ, and was for a time in the possession of Antiochus in his war against the Romans, but was taken by the consul Acilius Glabrio in 191. In the time of Pliny Pharsalus was a free state. The ancient city was nearly 4 miles in circuit, and situated upon an eminence which was 600 or 700 feet high, and on 3 sides was defended by precipices. "It is," says Leake, "one of the most important military positions in Greece, as standing at the entrance of the most direct and central of the passes which lead from the plains of Thessaly to the vale of the Spercheius and Thermopylæ."—Pharsalus is chiefly celebrated for the battle fought in its territory (called Pharsalia) on Aug. 9, 48 B. C., between Cæsar and Pompey. The army of the former, consisting of 21,000 foot and 1,000 horse, was posted on the plain between Pharsalus and the Enipeus; that of the latter, consisting of 45,000 foot and 7,000 horse, was drawn up opposite. Pompey expected with his body of cavalry to turn Cæsar's right wing, and thus gain the victory. The army of Cæsar advanced to the charge on a run, and when the engagement became general along the whole line, Pompey began the execution of his manœuvre; but after driving back the small body of horse opposed to them, his cavalry were unexpectedly assailed by 6 cohorts of infantry, which Cæsar, suspecting the design of the enemy, had stationed on the right as a reserve force. Pompey's cavalry were put to flight, and, the 6 cohorts turning his left wing, his troops gave way in every direction. He himself retired to the camp in great dejection, and after the rout became general he fled. His camp was stormed about the middle of the day, and the victory was rendered complete by the surrender of 4 legions, which Cæsar, who never gave any rest to a flying enemy, succeeded in taking prisoners about nightfall. This battle decided the fate of the Roman world.

PHASCOGALE, or Pouched Mouse, a genus of small marsupial mammals of the *dasyurus* family, inhabiting Australia and Tasmania. The dental formula is: incisors $\frac{8}{6}$, the two anterior in each jaw larger than the others, canines $\frac{1-1}{1-1}$, premolars $\frac{3-3}{3-3}$, true molars $\frac{4-4}{4-4}$, studded with prickly tubercles. All the feet are 5-toed, the inner one on the hind feet a small, nailless, prehensile thumb; tail either wholly clothed with short hairs, or with long and bushy ones on the apical portion; the females are sometimes destitute of a pouch, the young being protected only by the hair of the abdomen; mammæ 8, arranged in a circle. The cranial cavity and occipital opening are comparatively large, and the muscular ridges of the skull and the cervical spinous processes feebly developed; the muzzle pointed and moderately long, muffle naked, nostrils lateral, ears moderate, and limbs short; they are insectivorous, and climb trees in search of food. The largest species is the brush-tailed phascogale (*P. penicillata*, Temm.), about the size of a common rat, 18 inches long, of which the tail is one half; the fur is long and soft, gray pencilled with white, below white, the middle part of the head dusky, and the tail bushy, with long black hairs except on the basal third, where they are short and gray; it is widely distributed in Australia; it makes a nest in the hollows of trees, and is accused of attacking the poultry and plundering the stores of the settlers. The handsome-tailed phascogale (*P. calura*, Gould) is about 10¼ inches long, of which the tail is 5; it is ashy gray above, yellowish white below, with the base of the tail bright rust color and the apical half with long black hairs; it inhabits W. Australia. Several other species are described by Waterhouse ("Natural History of the Mammalia," vol. i.), in which the tail is uniformly clothed with short hairs; they are pretty and active animals, varying in length from 11 to 6 inches, of which the tail is one third.

PHAULCON. See Constantine Faulcon.

PHEASANT, an extensive family of gallinaceous birds, comprising the sub-families *pavoninæ* or peacocks, *gallinæ* or jungle fowls, *phasianinæ* or pheasants proper, *lophophorinæ* or monauls, and *meleagrinæ* or turkeys. Of these, the 1st and most of the 2d have been described; the 5th will be found under TURKEY; and only the 3d, 4th, and a part of the 2d will be noticed here. The family includes the handsomest of the rasorial birds, and is for the most part confined to Asia and its islands; the Guinea fowl, however, is African and the turkeys American; the latter, with the common fowl and the peacock, have been completely domesticated, and are distributed very generally over the globe. The head is rarely feathered all over, but more or less about the eyes and often a considerable part of the neck are bare, and furnished with crests, wattles, and combs of singular forms.—In the *phasianinæ* may be included the genera *phasianus* (Linn.), *thaumalea* (Wagl.), and *argus* (Temm.). In *phasianus* the bill is moderate, strong, vaulted and slightly arched at the tip, which overhangs the lower mandible; the nostrils in a lateral groove and partly closed by membrane; the wings short and rounded, the 4th and 5th quills the longest; tail lengthened, wedge-shaped, with each feather attenuated; tarsi robust, covered in front with divided scales, and in the males armed with a strong spur; toes strong, united at the base by a membrane, the hind toe short and elevated, and the claws stout and slightly curved. The few species described are naturally inhabitants of the mountainous regions of Asia, but some have been naturalized in temperate Europe; they frequent thick jungles, the sexes keeping separate except in the breeding season, when they form families of a single male and several females, each with their special locality, from which all intruders are expelled. They are rapid runners, and fly rapidly and noisily for short distances; the food consists of grains, seeds, bulbs, and insects, which they seek usually toward sunset; they roost in trees in the cold season; the eggs are 10 or 12, and are laid generally on the ground, with very little if any nest. The common pheasant (*P. Colchicus*, Linn.) is about 3 feet long, of which the tail is nearly one half; the male is bright rufous above, the head and neck blue with green and golden reflections, and variegated with black and white; the cheeks bare and red, the sides and lower parts purplish chestnut; tail with transverse black bands; the female is smaller, brownish gray, varied with reddish and dusky. This bird is supposed to have been introduced from the banks of the Phasis, a river of ancient Colchis, on the E. coast of the Black sea, whence its scientific name; it is generally distributed over S. Europe, but in the northern parts requires protection by stringent game laws to prevent its extinction; it could probably be introduced with advantage into the temperate parts of America. Its habits are much like those of the common fowl; it breeds in confinement, but is apt to neglect its eggs, which are therefore usually placed under a common hen; it will breed with the common and Guinea fowls, in the wild state with the ring-necked species, and, it is stated, also with the black grouse. A breed called the ring-necked pheasant has a white ring around the neck, and is either a mere variety, or a hybrid with the *P. torquatus* (Gmel.) of China. Pheasant shooting is a famous pastime in Europe, and great numbers are killed at *battues;* they are special favorites with poachers; the flesh is excellent. They are subject to an epidemic and often fatal disease in confinement, called the "gapes," caused by a nematoid strongyloid parasitic worm (*sclerostomum syngamus*, Dies.), which produces inflammatory swelling of the windpipe, and frequently suffocation; the best remedy is fumigation with tobacco carried to stupefaction. Other more beautiful species from Japan and northern Asia are Diard's pheasant (*P. versicolor*, Vieill.), of a general rich green color with golden and violet reflections, throat and fore neck bright blue, and back variegated with golden yellow, purple, and violet; Sömmering's pheasant (*P. Soemmeringii*, Temm.), of a rich reddish purple, with bronzy lustre, and each feather with brilliant edging; and Reeve's pheasant (*P. superbus*, Lath.), rich yellowish above, with white head, neck, and under parts, the middle of the latter being black; tail sometimes 4 feet long, grayish white with golden red edges and crescentic bars of brown and chestnut.—The genus *thaumalea* differs from the last only in having the head furnished with a crest of long slender feathers, and a kind of tippet of lengthened feathers around the back of the neck. The golden pheasant (*T. picta*, Wagl.) is perhaps the most gaudy of the family, the brilliancy and variety of its plumage being beyond description; it is, however, well known in aviaries and collections; the general color is golden yellow above, scarlet below, with yellow crest, green back, brown hood, and blue secondaries; it is about the size of the common pheasant, but the tail is longer; as usual in the family, the female has a plain brownish plumage. It is a hardy bird, a native of China, kept in domestication, and highly prized for the table. Lady Amherst's pheasant (*T. Amherstiæ*, Leadb.) has the top of the head, breast, back, and wings rich metallic green, the tippet and lower parts white, the former banded and tipped with green, and the tail variegated with brown, green, yellow, scarlet, and white.—In the genus *argus* the 7th and 8th quills of the wings are the longest, with the secondaries remarkably prolonged; the tail is long and compressed, with the 2 middle feathers much elongated; the tarsi long and slender, without spurs; head and neck covered only with scattered hairs. The argus pheasant (*A. giganteus*, Temm.) is about the size of a common fowl, but the 2 middle tail feathers are 3½ or 4 feet long; the under parts and lower neck are reddish brown spotted with yellow and black; the back ochrey yellow, with black and brown spots; tail deep chestnut with white spots surrounded by a black ring; secondaries about 3 feet long, brownish, but when spread adorned with beautiful ocellated spots like those in the peacock's tail; the female is dull chestnut red, varied with yellowish brown and black, without the development of the tail feathers and secondaries. It is found in the dense forests of Sumatra and the other large East Indian islands, where it lives in pairs; the long secondaries, which render flight difficult, are of great service to the bird when running, acting in the manner of sails; these feathers, with those of other brilliant gallinaceous birds, are exported from Batavia as ornaments for dresses, screens, fans, and similar objects. This bird does not thrive in confinement.—In the sub-family *gallinæ* should be mentioned here the genus *gallophasis* (Hodgs.) or *euplocamus* (Temm.), in which the wings are moderate and much rounded, with the 4th to the 7th quills nearly equal and longest, and the secondaries ample and broad; tail and its coverts ample, with compressed sides, arched or straight, and sometimes forked; tarsi long, strong, and armed with a large spur; the sides of the head bare, with wattles at the base of the lower mandible, and sometimes a crest. They inhabit the primeval forests of India and its islands, preferring the close covers of mountainous districts; they are commonly seen in parties of 8 or 10, which run rapidly among the brushwood when alarmed. Macartney's or the fire-backed pheasant (*G. ignitus*, Shaw), a native of Sumatra, is about 2 feet long; the general color is deep black, with steel-blue reflections; on the middle of the back is a fiery orange patch, with brilliant gloss; rump and tail coverts broad and truncated, bluish green with orange edges, and central feathers white, legs and feet vermilion; head with a crest of slender barbed feathers; the female is of a cinnamon brown color. The silver pheasant (*G. nycthemerus*, Hodgs.) has the throat, under parts, and ample crest glossy purplish black, the feathers being generally lanceolate; the rest of the plumage pure white, the webs of the feathers of the back diagonally streaked with black; legs and feet purple lake, and large, naked, velvety space about the eyes bright vermilion. It is a powerful bird, and a match for a game cock; it is a native of northern China, where it is often kept in a tame state; being very hardy, it is frequently carried to Europe, and, with the golden pheasant, forms a pleasing addition to aviaries. About a dozen other species of the genus are described.—The genus *ceriornis* (Swains.) includes the brilliant tragopans; these have a short, thick bill, arched and obtuse; wings ample and very concave; tail large and rounded, and tarsi robust; the head has a large horn over each eye, and under the throat two short naked wattles. They are peculiar to the dense pine forests of the mountains of India; they are solitary and hard to approach, and discoverable only by their shrill whistle; their food consists of grains, roots, larvæ, and insects. The Nepaul tragopan or horned pheasant (*C. Lathami*, Gray) is a very beautiful bird, about as large as the domestic fowl; the prevailing color is purplish cinnamon red, the wings and upper parts umber brown, the tip of each feather with a white eye spot, largest on the sides; tail almost concealed by the ample coverts, which have a conspicuous white spot; bare skin of head bluish purple; long feathers of crown purplish black, deep crimson red at the occiput. The golden-breasted pheasant (*C. melanocephala*, Gray) is a still more beautiful species; the wings and upper parts are deep wood-brown, each feather with a white eye spot surrounded with black; back of neck, upper back, and shoulders purplish red; black *crest* of disunited feathers; horns and long wattles bluish purple, and beneath a patch of brilliant golden orange of hard horny feathers; rest of under parts deep black. These tragopans belong to the genus *satyra* of Lesson.—In the sub-family *lophophorinæ* belong some very remarkable pheasants. The genus *lophophorus* (Temm.) has the upper mandible very much curved over the lower, the 4th and 5th quills longest, tail ample and rounded, and tarsi armed with a short spur. The Impeyan pheasant (*L. Impeyanus*, Vieill.) is about 2 feet long; the colors of the plumage defy description or representation, being resplendent with ever-changing hues of green, steel-blue, violet, golden, and bronze, dense and metallic in appearance, but soft and velvety to the touch; the middle of the back pure white, and the tail bright chestnut with transverse bars of a duller tint; on the head is a crest of feathers with naked shafts and oval tip of metallic hue; the female is smaller, of a general reddish brown color, mottled with spots and bars, with throat and fore neck white. This species, named in honor of Lady Impey, inhabits the mountain ranges of the Himalaya and Nepaul, and, with many other beautifully plumaged birds, enlivens these dreary solitudes. In the genus *pucrasia* (Gray) the bill is short, broad at the base, and much arched; the 4th quill the longest, and the 3d and 5th equal; tail long and wedge-shaped, and tarsi rather slender. The Pucras pheasant (*P. macrolopha*, Less.) is rich brown above, the feathers lanceolate, and the under parts rich chestnut bordered with long lanceolate white plumes; head, throat, and neck beautiful green, with blue and violet reflections; patch of white on the sides of neck; crest of long broad feathers, of the color of the head and neck, the shortest ones reddish yellow. It inhabits the alpine regions of India, where its flesh is highly esteemed. In the genus *tetraogallus* (Gray) belongs the Caucasian pheasant (*T. Caucasicus*, Pall.), cinereous above with minute undulations and edges of cream color; breast cinereous, with brown arrow heads on the sides, abdomen creamy white, vent and thighs black. This species, found in the inaccessible mountain ranges of N. and W. Asia, is very difficult to procure; it is said to warn the wild goats of the proximity of man by a curious whistling note; the food consists principally of grass.

PHELPS, Almira Hart Lincoln, an American teacher and writer, born in Berlin, Conn., in 1793. At the age of 19 she taught school at her father's house, and not long afterward took charge of the Sandy Hill (N. Y.) female academy. In 1817 she was married to Simeon Lincoln of Hartford, then editor of the "Connecticut Mirror." He died in 1823, and soon afterward she became associated with her sister Mrs. Emma Willard in the direction of the female seminary at Troy, N. Y., where she continued until 1831, when she was married to the Hon. John Phelps of Vermont. During her residence at Troy she published a text book on botany, which has undergone several revisions, and still continues in use for schools and colleges. In 1838 she took charge of a seminary at West Chester, Penn., and afterward taught in Rahway, N. J. In 1841, on the invitation of the bishop of Maryland, Mr. and Mrs. Phelps took charge of the Patapsco institute, a diocesan female school, which soon attained a high reputation; and after the death of Mr. Phelps in 1848 Mrs. Phelps conducted it alone until 1856, when she resigned. She now (1861) resides in Baltimore, Md. She has published "Familiar Lectures on Botany" (Hartford, 1829; revised and enlarged with a supplement, New York, 1861); "Dictionary of Chemistry" (New York, 1830); "Botany for Beginners" (Hartford, 1831); "Geology for Beginners" (Brattleborough, 1832); "Female Student, or Fireside Friend" (Boston, 1833); "Caroline Westerly" (New York, 1833); "Chemistry for Beginners" (New York, 1834); "Progressive Education," translated from the French (Boston, 1834); "Lectures on Natural Philosophy" (New York, 1835; revised and enlarged, 1854); "Lectures on Chemistry" (New York, 1837; revised ed., 1857); "Natural Philosophy for Beginners" (New York, 1837); "Ida Norman" (New York, 1854); "Hours with my Pupils" (New York, 1859); and "Christian Households" (1860).

PHELPS, Anson Greene, an American merchant, born in Simsbury, Conn., in March, 1781, died in New York, Nov. 30, 1853. He lost both his parents while young, and learned the trade of a saddler. At the age of 18 he removed to Hartford, and established himself there in his trade, and founded also a branch business in Charleston, S. C. In 1815 he engaged in New York city as a dealer in tin plate and heavy metals. Having accumulated a large fortune partly by investments in real estate, he devoted himself with great zeal to benevolent enterprises, and was president of the New York blind asylum, the American board of commissioners for foreign missions, and the New York branch of the colonization society. At his death he bequeathed to various charitable institutions sums amounting in the whole to $371,000, and placed in the hands of his only son a fund of $100,000, the interest of which was to be distributed in charity at his son's discretion. In addition to large legacies to 24 grandchildren, he intrusted to each a fund of $5,000 for charitable purposes.

PHELPS, Elizabeth Stuart, an American writer, born in Andover, Mass., Aug. 13, 1815, died there, Nov. 30, 1852. She was a daughter of Professor Moses Stuart. In 1842 she was married to the Rev. Austin Phelps, now professor in the Andover theological seminary. "The Sunny Side," one of the most popular of her works, after several rejections by different publishers, was at last published by her friends, and almost immediately attained an unprecedented sale, reaching its 40th thousand in less than two years, and continuing to sell largely to the present time. It was followed, in rapid succession, by the "Kitty Brown Series" (4 vols., Philadelphia, 1849), "Peep at Number Five," "Tell-Tale," "Angel over the Right Shoulder," and soon after her death by "The Last Leaf from Sunny Side," all published at Boston. These, as well as some compilations of her magazine and newspaper articles, have met with a very extensive sale.

PHENE, a name sometimes given to benzole, a compound of 12 atoms of carbon and 6 of hydrogen, probably united according to the formula $(C_{12}H_5)H$. A series of compounds are recognized founded on the hypothetical base, $C_{12}H_5$, which is known as phenyle, and the series as the phenic series. Phenole, or phenic acid, known as carbolic acid, is a principal member of this series, and its compounds are phenates. (See Benzole, and Carbolic Acid.)

PHERECYDES. I. A Greek philosopher of Syros, one of the Cyclades, who flourished about 544 B. C., and is said to have been the teacher of Pythagoras. He studied under Pittacus of Mitylene, was a rival of Thales, travelled in Egypt, and was instructed by the Egyptians and Chaldeans. He wrote a philosophical work, which was extant in the Alexandrian period, in which he maintained that there were 3 principia, Zeus or Æther, Chthon or Earth, and Cronos or Time, and 4 elements, fire, air, earth, and water; and that from these all things sprang. His distinguishing doctrine was that of metempsychosis, or according to others that of the immortality of the soul. He was the first to write a philosophical treatise in prose, and according to some the first to write in prose at all. The usual account of his death is that he was eaten up by worms and insects. The fragments of Pherecydes are printed by August Wolf in the first part of his *Literarische Analecten* (Berlin, 1817). II. A Greek logographer, surnamed of Athens, because he passed most of his life in that city, or of Leros, because he was born in that island. He flourished probably about 480 B. C. He wrote a work on mythology, which is mentioned under various titles, and consisted of 10 books, beginning with the genealogy of the gods, and coming down to the families of the heroic age. The fragments of it have been collected by

Sturz, *Pherecydis Fragmenta* (Leipsic, 1824), and by the Müllers in *Fragmenta Historicorum Græcorum.*

PHIDIAS, the son of Charmides, the most illustrious sculptor of antiquity, born in Athens probably in 490 B. C., died there about 432. The details of his personal history are to be gleaned only from detached passages in the writings of classic authors and scholiasts; and so conflicting are these statements, that the dates of the most important events in his career can only be approximately ascertained. His biography is consequently in a large degree the result of a balancing of authorities. He is supposed to have belonged to a family of artists, and is said to have originally occupied himself with painting, an art practised with great repute by his nephew Panænus. He was instructed in sculpture by two native artists, Hegias and Ageladas, and probably between the ages of 25 and 30 began to exercise his calling in Athens. His subjects were for the most part sacred, and among the works attributed to him are no fewer than 9 statues of Athena (Minerva), the tutelary goddess of his native city. One of these, at Pellene in Achaia, was perhaps his earliest public work. About the same time he executed the group of 13 bronze statues dedicated by the Athenians at Delphi out of the tithe of their share of the spoils taken from the Persians at Marathon, and the colossal bronze statue of Athena Promachus in the Athenian acropolis, 50 or 60 feet in height, and visible from a considerable distance by ships approaching Athens, which is also said to have been made from the spoils of Marathon. Pericles seems to have been so impressed with the genius of Phidias, that he not only intrusted him with the execution of the principal statues intended to adorn the public buildings of Athens, but made him general director of all the great works of art in progress in that city, including the Propylæa of the acropolis and the Parthenon. For the latter he executed the colossal chryselephantine or ivory and gold statue of Athena, which stood in the *prodomus* or front chamber of the temple, and which, with the statue of the Olympian Jupiter at Olympia, constituted the grandest productions of antique plastic art. It embodied the idea of the virgin goddess, as that of Athena Promachus did of the warrior goddess, and was formed of plates of ivory laid upon a core of wood or stone for the flesh parts, while the drapery, the ægis, the shield, the helmet, and other accessories were of solid gold, adorned with devices and elaborately engraved with subjects taken from Athenian legends. No expense was spared by the Athenians to make this statue worthy of the shrine in which it was enclosed; and it is said that when the sculptor intimated his desire to execute it in marble, they directed him to employ those materials which were the most costly. The weight of the gold has been estimated at between 40 and 50 talents, or somewhat more than $500,000. It was removed from the statue by Lachares in the time of Demetrius Poliorcetes, about 296 B. C. Previous to the time of Phidias, colossal statues when not of bronze were acrolithic, the head, hands, and feet being of marble, while the body was of wood, concealed by real drapery; and the substitution of ivory and gold for these materials is believed to have been his invention. Supposed copies of the statue are in existence, and restorations have been attempted by Quatremère de Quincy and others. The architectural sculptures of the Parthenon, which were in all probability designed by Phidias, and perhaps in some instances executed by him, are described under the head of ELGIN MARBLES. The Athena was finished in 438, and, with the Parthenon, was dedicated in the same year. Shortly afterward, at the invitation of the Eleans, Phidias commenced at Olympia the colossal chryselephantine statue of Jupiter, which, in the opinion of all the authors of antiquity who have written upon the subject, was the sculptor's masterpiece. The god was represented as seated upon a throne of cedar wood, holding in one hand an ivory and gold statue of Victory and in the other a sceptre, with his feet supported by a footstool, which, as well as every part of the throne, and its base, was elaborately adorned with gold, ivory, ebony, and gems, with enchased work and paintings, with sculptures of precious metals, and with numerous accessory groups and bass-reliefs representing allegories or legends. "The idea which Phidias essayed to embody in this, his greatest work, was that of the supreme deity of the Hellenic nation, no longer engaged in conflicts with the Titans and the giants, but having laid aside his thunderbolt, and enthroned as a conqueror, in perfect majesty and repose, ruling with a nod the subject world, and more especially presiding, at the centre of the Hellenic union, over those games which were the expression of that religious and political union, and giving his blessing to those victories which were the highest honor that a Greek could gain. . . . . Expression was given to this idea not only by the whole proportions and configuration of the statue, but more especially by the shape and position of the head. The height and expansive arch of the forehead, the masses of hair gently falling forward, the largeness of the facial angle, which exceeded 90 degrees, the shape of the eyebrows, the perfect calmness and commanding majesty of the large and full-opened eyes, the expressive repose of all the features, and the slight forward inclination of the head, are the chief elements that go to make up that representation which, from the time of Phidias downward, has been regarded as the perfect ideal of supreme majesty and entire complacency of the 'father of gods and men' impersonated in a human form." (P. Smith.) Pausanias, who has given the fullest description of the statue, relates that the god testified his approval of the sculptor's work by striking the pavement in front of it with lightning; and according to Arrian it was considered a calamity to die without having seen the Jupiter of Phidias. The statue was nearly 60 feet in height, and occupied Phidias and his assistants, among whom were Colotes and Alcamenes, sculptors, and Panænus the painter, between 4 and 5 years, from 437 probably to 433 B. C. The Eleans granted him the honor of inscribing upon the footstool the following inscription:

Φειδιας Χαρμιδου υιος Αθηναιος μ' εποησεν;

and his descendants were intrusted with the office of cleaning and preserving the statue. It was removed by the emperor Theodosius I. to Constantinople, where it perished by fire in A. D. 475. Restorations of it have been attempted by Quatremère de Quincy and Flaxman. Upon the completion of the statue Phidias returned to Athens, where a formidable party was aiming at the overthrow of Pericles. Fearing to attack the great Athenian statesman directly, his enemies sought to undermine his influence by persecuting his friends; and Phidias, who for many years had been on terms of intimacy with Pericles, was accused by one Menon, a workman employed upon the Parthenon, of having stolen a portion of the gold appropriated to the chryselephantine statue of Athena. As the gold however had been affixed to the statue in such a manner that it could be removed, the accusers were challenged to substantiate their charge by weighing it, which they shrank from doing. Another charge was then made against the sculptor of having introduced portraits of himself and Pericles in the bass-reliefs of the shield representing the battle of the Amazons. As this act was supposed to imply a dishonor to the national religion, he was thrown into prison, where, according to Plutarch, he died either by poison or by a natural death. In addition to the works mentioned, Phidias executed a number of statues of deities for Athens and other cities of Greece, including an acrolithic Athena at Platæa, and a famous chryselephantine Æsculapius at Epidaurus.—Phidias was the first to break away from the stiff, archaic style of the earlier school of Greek sculptors, and to aim at pure and severe ideal beauty. He is said never to have imitated exactly any human model, however beautiful, nor do his works exhibit any of that sensuous grace which in the productions of succeeding sculpsors tended to deprave taste and to corrupt the art. Dignity, majesty, and repose were his distinguishing characteristics, and in no other artist have they probably ever been united in so high a degree. He has been called the "sculptor of the gods," and his age the golden age of sculpture.

PHIGALIA, or Phialia, an ancient town of Arcadia, near the borders of Messenia and Elis, on the right bank of the river Neda, of which ruins still exist near the modern village of Paulitza. Nothing is known of its origin. It preserved its freedom against the encroachments of the Spartans, and although in 559 B. C. the inhabitants were compelled to abandon it, they soon returned. Its celebrity is chiefly due to the temple, which was situated on Mt. Cotylion, about 6 m. N. E. from the city, and was described by Pausanias to be, after that at Tegea, the most beautiful of all the temples of the Peloponnesus. It was built of yellowish brown limestone by Ictinus, who in conjunction with others had erected various public works at Athens during the age of Pericles, and was dedicated to Apollo Epicurius, because the god had cured the citizens of the plague during the Peloponnesian war. Its ruins were explored in 1812, and the entire sculptured frieze of the cella was brought from it for the British museum in 1814. It represents the contests between the centaurs and lapithæ and between the Amazons and the Greeks, and is known as the Phigalian marbles.

PHILADELPHIA, the metropolis of Pennsylvania, and the second city of the United States in population, situated on the Delaware river, 96 m. by the course of the stream and bay from the sea, 136 m. N. E. from Washington, and 87 m. S. W. from New York. The old state house, now independence hall, which is near the centre of the city, is in lat. 39° 56′ 59″ N. and long. 75° 9′ 54″ W. The tide ascends the Delaware river far above the city on the E. side, and the Schuylkill on the W. side to its upper or N. limit, thus surrounding it with tidal waters. Its site is mostly a plain from 2 to 4 m. in width between these rivers, elevated 30 to 80 feet above tide. This spacious plain extends beyond both rivers E. and W., and on it are built the suburban city of Camden E. of the Delaware, and West Philadelphia W. of the Schuylkill. Northward the surface rises in low hills, upon which, and along the borders of the rivers, several populous manufacturing and residential suburbs are built within the municipal limits. The densely built part of the city is about 5 m. in extent along the Delaware, and from 3 to 3½ m. in width E. and W., covering an area of nearly 12 sq. m. Previous to 1854 the municipality of Philadelphia proper was confined to the belt between the two rivers originally assigned as the city limits by Penn, an area nearly a mile in width by two miles in length. Adjoining this several districts possessed distinct municipal organizations, those of Southwark and Moyamensing on the S., Northern Liberties, Kensington, Spring Garden, and Penn Township on the N., and West Philadelphia beyond the Schuylkill. Most of this area being then compactly built upon, and the less populous suburbs rapidly becoming connected with the central city, the municipalities were consolidated in 1854, and extended to embrace the entire county, an area of 120 sq. m. Most of this added surface lies N. of the old city; it is thickly studded with villages, and has also the large towns of Frankford, Germantown, and

Manayunk, each containing from 8,000 to 10,000 inhabitants. The immediate front on the Delaware was originally a bluff bank of gravel 20 to 30 feet high, on the slope and river edge of which Penn forbade the settlers to build, intending it to afford an open prospect and free public levee. A few wharf buildings only were permitted until after Penn's death; it is now closely built up with lofty warehouses on narrow streets, and many efforts have been made to restore some degree of the original plan, Stephen Girard having left a large sum of money to the city for that purpose. The water on this front is 25 to 60 feet deep at the pier heads at low tide for more than a mile and a half, and the strong current setting on the W. shore at both flood and ebb tide prevents encroachments on the harbor by deposit. The rise of tide is but 6 feet, and floods or overflows are unknown. The foundation of the city is mainly a dry, well drained gravel, making the sewerage easy and perfect. Ledges of gneiss and imperfect granite underlie the upper part of the city; Fairmount reservoir rests on a large and peculiar ledge of this sort, 80 feet high, near the Schuylkill in the N. W. part.—The decennial progress of population since 1790 is as follows:

1790	42,520	1830	167,325
1800	70,287	1840	258,037
1810	96,287	1850	408,762
1820	119,325	1860	565,529

The whole number of persons of foreign birth in 1860 was 121,699, nearly 20 per cent. The deaths in 1860 numbered 11,565, and the births for the last 6 months 8,484, no trustworthy record having been previously kept.—The original regularity of plan on which the streets were laid out has been preserved in all additions to the city. High street, now Market, the great central street E. and W., is 100 feet wide, and built up for more than 3 m. Broad street is the central street N. and S., 113 feet wide, and built upon for over 3 m. The other great streets are from 50 to 66 feet wide, forming squares with sides of from 400 to 450 feet, and regularly succeeding each other each way from the central streets named. In most cases the squares are subdivided by small streets laid out at a later period. Chestnut street, the first E. and W. street S. of Market, is the fashionable thoroughfare. Walnut, Locust, Spruce, and Pine streets succeed each other on the S., and are occupied mainly by wealthy residents; further southward are Lombard, South, Shippen, Fitzwater, Christian, and Washington. N. of Market there are, first, Arch, Race, and Vine, leading and wealthy streets; next Callowhill, Spring Garden, Green, &c. The banking and financial centre is in Third and Walnut streets; the dry goods and other jobbing trade in Third and Market streets; the commission houses in Front and Chestnut; the shipping and provision trade on Water street and Delaware avenue; the newspaper offices on Third and Chestnut. Broad street has a large business in produce, brought to it by western railroads. The streets running N. and S. are numbered from the Delaware, Front, Second, &c., to Twenty-fifth street. Houses on all the streets are now numbered in hundreds corresponding to each square, from Front street westward, and from Market street N. and S.; thus at Tenth street W. the numbers are 1,000, 1,002, &c.; and at 10 squares N. or S. of Market street the same numbers occur on streets running N. and S. The pavements of the streets generally are of cobblestone, with brick gutters, granite curb, and brick sidewalks. Cubical blocks are laid in Chestnut, Third, Walnut, and Second streets, in the business centre. The city is lighted mainly by gas lamps, of which there were 5,844 in 1860, and 401 lamps burning fluid; total number, 6,245. Of gas supplied to these in 1860 the total was 119,994,816 feet; and the total cost of the lighting department for that year was $225,000.—There are 7 squares planted as parks within the densely occupied portion of the city: Independence square, surrounding the state house; Washington square near it on the S. W., celebrated as the potter's field of the revolution, and as the spot on which the corner stone of a national monument to Washington has been laid; Franklin square, with a fountain; Logan square, with a deer park; Penn square in the centre of the city, &c. Hunting park in the northern suburbs, and Fairmount park along the Schuylkill on the N. W., are in rapid progress of improvement on an extensive scale. Many highly improved cemeteries exist near the city, the chief of which is Laurel Hill, 5 miles N. W. Others are Woodlands, Cathedral, Odd Fellows', Mount Moriah, Glenwood, Monument, and Mount Vernon. The churchyard cemeteries within the city were originally large, and Franklin, with many other historical names, may be found in Christ church and other burial grounds. Laurel Hill is justly celebrated and much visited; it has an area of but 25 acres. Adjacent to it is South Laurel Hill, occupying 30 acres in a similarly attractive position.—The style of building has always been principally of brick, the vicinity producing very superior pressed brick at a low cost. Numbers of brick buildings remain standing and in good preservation which were erected before 1760; those built since 1800 have marble facings and marble steps, and are remarkably uniform in height and general character. All are conspicuous for neatness and durability; even the cheaply built blocks and suburban streets intended for laborers' residences are distinguished for neatness, and differ externally from those of the wealthier class more in size than in any thing else. Tenement houses are unknown. For the best residences marble and brown stone have been much used, and in the business streets iron fronts are common. Of public buildings, the principal in marble are the old United States bank (now the Girard bank), the second United States bank (now the custom house, costing $500,000), the old Pennsylvania bank, and the United States mint, all fine marble buildings of Grecian architecture. Girard college is the chief building of this class, and the finest in the United States; it is built in the Corinthian style, 218 feet long, 160 feet wide, and 97 feet high, at a cost exceeding $1,000,000. The merchants' exchange is a fine structure of marble, with an ornamented front on Dock street, a semicircular colonnade of 8 pillars, and a spacious rotunda within, on that side. The farmers' and mechanics' bank in Chestnut street, recently erected, is a very superior structure of marble in the modern style; and adjoining it is the Philadelphia bank, a fire-proof granite building of great cost, built in 1856 and 1857. The old Christ church (Episcopal), celebrated in early colonial times, is still a fine building, and in perfect preservation. St. Peter's, in Third and Pine streets, a church of note in historical times, is also still preserved. The church of the Holy Trinity, recently erected in Twentieth and Walnut streets, is a fine specimen of Norman architecture, as are also St. Mark's, in the later or English Gothic style, in Sixteenth and Locust streets; St. Luke's, in the Grecian style, &c. The West Arch street Presbyterian church is a very handsome and spacious structure in the Roman Corinthian style; the West Spruce street, the Calvary, the Logan square, and other churches are fine buildings in various styles. The new Catholic cathedral on Logan square is an imposing structure of brown stone, in the classic or Roman style, not yet fully finished. The academy of music, recently erected, is without a superior for space and internal beauty. Arch street theatre is perhaps the most noted of theatres proper; next are the Walnut and the Continental, both in Walnut street between Eighth and Ninth; the Olympic in Race street; Sanford's opera house; a German theatre in Callowhill street, &c. Concert hall in Chestnut street, national hall in Market, musical fund hall in Locust, the assembly building, Jayne's hall, metropolitan hall, national guards' hall, and many others, are occupied for public meetings and entertainments. Carpenters' hall, the first place of meeting of the continental congress, is still maintained by the carpenters' society. Independence hall generally signifies the whole of the old state house, but more specifically the large eastern room of the lower floor. In this hall Lafayette had a great public reception in 1824, and in 1830 a public movement was made to restore it to its original condition, and to set it apart "for dignified purposes only." The portraits of the great men of the revolution were procured, and historical relics were placed there for permanent preservation. In 1854 the consolidated city took a renewed interest in it, the old independence bell was taken from the tower and placed in the hall, a large number of portraits from the Peale gallery were hung on the walls, and a keeper was appointed.—The hotels of Philadelphia are not behind those of other metropolitan American cities. The Girard house in Chestnut street, and the La Pierre in Broad street, have been celebrated for years; both are fine architectural structures, built in part of brown stone. The continental hotel, recently erected, is equal if not superior to any other in the United States in size and beauty; it covers 41,536 square feet, and is 235 feet in depth by 194 feet front. The main hall is 185 feet in depth, and the central open area 38 by 78 feet. It has over 100 complete suites of family rooms, and employs 280 persons in its regular care. The building is of brown stone, divided into 6 stories in the front and 9 in the rear. Very many hotels exist in various parts of the city with the signs, arms, and insignia of revolutionary times. The chief business streets are now occupied with a large number of costly and superior buildings of marble, granite, iron, and sandstone. The number of buildings erected in the city in 1860 was 2,876, and the census of that year gives 89,978 as the total number of dwellings. There are 350 places of worship, viz.: 32 Baptist, 63 Episcopal, 14 Friends', 7 Jewish, 14 Lutheran, 59 Methodist Episcopal, 4 Methodist Protestant, 20 Presbyterian New School, 34 Presbyterian Old School, 20 other Presbyterian, 30 Roman Catholic, 2 Unitarian, 3 Universalist, 28 of other denominations, and 20 of various denominations for colored people. There are 6 Bible societies, 18 missionary societies, and 12 tract and religious publication societies. The operations of many of these are very extensive, particularly the Pennsylvania Bible society, the American Sunday school union, the Presbyterian board of publication, &c.—The principal libraries of Philadelphia are the Philadelphia library, founded by Franklin, and combined with the Union and Loganian libraries. It had 70,000 volumes on Jan. 1, 1861. It is free to strangers, and open from sunrise to sunset daily. Stock and shareholders can use it as a circulating library. The philosophical society has a library of 21,000 volumes, and a very valuable collection of coins, medals, maps, charts, &c., of scientific and historical value. The mercantile library has 21,500 volumes, with a large membership. Its income in 1860 was $11,351, and the number of volumes lent to subscribers and members was 87,500. It is open from 9 A. M. to 10 P. M., and has a news reading room with 150 newspapers and 65 periodicals. The Athenæum has a library of 13,500 volumes. The academy of natural sciences, on Broad street, has a very valuable scientific library of 23,000 volumes, and the largest museum of natural history in the country, containing over 25,000 mounted specimens in ornithology alone. The apprentices' library has 15,000 volumes. The Franklin institute has about 7,000 volumes, a news room, and a course of scientific lectures; the mechanic and inventive arts are especially favored in the plan of its operations. The university of Pennsylvania has a library of 5,000 volumes, and a fine anatomical museum. The Pennsylvania hospiial has a library of 10,000 volumes, and various other institutions possess considerable libraries. There are also a number of large private libraries.—The academy of fine arts was established in 1807; it holds annual exhibitions, and owns about 1,000 valuable paintings. The medical colleges of the city are celebrated. The oldest is the medical school of the university, which was established in 1765; it has 7 professors, and on its catalogue for 1860–'61 there are 466 students; the number of alumni is now about 8,500. The Jefferson medical college was established in 1825, and it has had extraordinary celebrity and success, the classes often numbering more than 600. The Pennsylvania medical college is a successful institution, with an annual class of about 200. There are several others, of more or less celebrity, including two female medical colleges. There is also a college of pharmacy, with 3 professors, for the instruction of druggists. The total number of students in the annual courses of these colleges is about 1,500. The literary colleges of Philadelphia, though generally successful, are not conspicuous. There are four whose organization and course of instruction entitle them to be so called: the university of Pennsylvania, the polytechnic college, the high school, and Girard college; though the last two are chiefly characterized by other features. The university has a law school, a regular collegiate department, and a scientific course. The Franklin institute has a scientific course, but does not confer degrees. The polytechnic college has a course described by its title. The high school, sustained by the city as the crowning feature of its free school system, has a thorough course of collegiate training, and confers the honor of degrees. The system of public schools of Philadelphia was established on a free basis in 1818. It is supported by city tax, and for the year ending Jan. 1, 1861, its total cost was $512,014. The whole number of schools at that date was 335, of which 2 were high schools, 54 grammar schools, 50 secondary, 170 primary, and 59 unclassified. The whole number of scholars was 63,522, and of teachers 1,197. The high school for boys had, at the beginning of 1861, 542 students; 11 were graduated from a 5 years' course, and 23 from a 4 years' course, in 1860. The girls' high school was organized in 1848, and during 1860 had 340 pupils. Its objects are mainly those of a normal or teachers' school. The public schools are in large, well built edifices, all owned by the city, and distributed so as to give access to them by the entire population. Text books are furnished by the city. Candidates for the higher grades undergo a rigid examination, but are subjected to no test even for graduation at the high school. The number of private schools of all grades is about 200, with an attendance of about 8,000. Girard college is a free school for orphans founded by Stephen Girard, and wholly a private charity, though placed under the guardianship of the city. In 1860 it had 340 students or beneficiaries, all of whom are domiciled and wholly supported at the college during their scholarship; but the period may be longer or shorter according to the capacity developed, and the judgment of the directors. On leaving, every student must be apprenticed to a trade or profession. The cost of the buildings alone was $2,000,000, including the principal one before spoken of. The cost of maintenance of the college in 1860 was $81,034. The estate, called the Girard trust, confided to the care of the city, is valued at over $2,000,000, but a large share of it is at present unproductive. The revenues beyond the wants of the college go to the improvement of the city, and to some minor charities; their total amount in 1860 was $193,749.—There are 18 daily, 4 tri-weekly, and 46 weekly newspapers in Philadelphia. Of magazines and periodicals the number is 44, about 30 of which are issued monthly. Two daily and 2 weekly journals are in the German language.—The benevolent institutions of Philadelphia are numerous. The Pennsylvania hospital was founded in 1752, wholly by private endowment. It has spacious buildings occupying a square near the centre of the city, and an insane department erected and maintained on a most liberal scale in the western suburbs. The hospital department treated 1,956 cases in the year ending with May, 1860, and the insane asylum had 274 patients under care; both have a class of patients who pay, though two thirds are treated without cost. There are, in all, 15 hospitals and dispensaries; 14 asylums, including 3 widows', 3 Magdalen, 4 orphan, and 2 insane asylums, and the U. S. naval asylum; 14 homes for the indigent, 7 of which are for friendless and destitute children, and one news boys' home; 4 lying-in charities; 7 societies for the relief and employment of the poor; 7 soup societies; 7 charity education societies, which include a school for feeble-minded children which is very successful; the house of refuge, which is in part penal; the institution for instruction of the blind; and the institution for the deaf and dumb. This last had 115 boys and 102 girls under its care at the close of 1860. The institution for the instruction of the blind is supported mainly by private endowment, but receives aid also from the state. It had 165 inmates on Jan. 1, 1861, of whom 8 were paying pupils. The indigent are employed as far as possible, goods to the value of $12,717 having been made in the year 1860. There are also a city pest hospital; a most important and useful prison society, which annually procures the relief of a large number of persons improperly committed; a society for the recovery of drowned persons; the union benevolent association, which expends $10,000 yearly in aid of the poor; a Friends' almshouse, and many other charity and benevolent trusts and societies. The secret beneficial societies number about 850, odd fellows, temperance societies, &c. The city almshouse occupies very extensive buildings west of the

Schuylkill; it had 3,091 inmates on Jan. 1, 1861. It is under the control of the board of guardians of the poor, who expended $224,935 for the almshouse and outside poor in 1860. The house of refuge for juvenile delinquents, maintained in part by the state, is a penal institution; it had 459 inmates at the close of 1860. It has extensive buildings erected at a cost of $350,000, work rooms, &c., and in 1860 cost for maintenance $46,383, one half of which was paid by the state; the eastern state penitentiary is in Philadelphia; its penal discipline is on the plan of solitary confinement, and it was here that this system originated; it had 464 convicts on Jan. 1, 1861. There is one large city prison only, which has departments representing the penitentiary, county gaol, and workhouse purposes. The total number of commitments in 1860 was 20,789, and the expenditure for its maintenance was $62,133. The police force numbers 733 men, all of whom are uniformed; they made 32,051 arrests in 1860. A police and fire alarm telegraph communicates with all parts of the city. The number of fires in 1860 was 398, and the loss of property by fire $363,232. There are 90 fire companies whose organization is recognized, and whose expenses are in part paid by the city, liberal appropriations being made for the companies, particularly those maintaining steam fire engines; but the system is voluntary. These companies have 26 steam fire engines, 46 hand engines, and 104 hose carriages. The active members number 8,000, and the total of active, honorary, and contributing members is 11,700. An association for the relief of disabled firemen numbers 500 members, and has a capital of $26,000.—The municipal government consists of a mayor, who is elected for 2 years; a select council, composed of one member for each ward, elected for 2 years; a common council, composed of one member for every 1,200 taxable inhabitants, for one year. The election is held on the first Tuesday in May. There are 24 wards, 24 members of the select council, and 95 members of the common council. In each ward aldermen are elected for 5 years, in number according to population, the whole number being 78 in 1860, who are also justices and committing magistrates. The revenue raised for support of the city government in 1860 was $2,724,709, produced by a tax of $1.75 per $100 on $155,697,669 of assessed valuation of real and personal property. The chief items of expenditure were: for highways, $404,536; police, $420,400; and fire department, $65,985. The funded debt of the city is $20,962,409. The total receipts of the city treasury for 1860 from all sources were $5,127,496, and the expenditures $5,508,704. The valuation of real and personal property in Philadelphia for 1861 was $154,038,707, of which only $2,712,702 was personal. The number of tax payers was 114,836.—Water works were first erected in 1799, the reservoir being in the present centre of the city at Penn square. In 1812 the Fairmount works were begun, and in 1827 the present admirable system of supply from them was completed. These works are remarkably beautiful, and have long constituted one of the principal attractions of the city. The water is elevated 92 feet to 4 reservoirs, which cover an area of about 4 acres, with 12¼ feet depth of water when full, and a capacity of 22,131,976 gallons. These reservoirs stand on a single block of rock, with no other elevations near it, the walks overlooking the city at a height of 100 feet. The entire present system of water supply is by 4 distinct works; that at Fairmount operates by water power; the Schuylkill works employ 4 steam engines; the Delaware works have 2 powerful engines, and the 24th ward works 2 engines. All the works in 1860 raised 7,465,740,277 gallons of water, or 75,886 tons daily, of which the Fairmount works supplied one half. The direct cost of raising the water was $1.74 per million gallons; the receipts for the year from water rents were $558,531, and the expenses of the works $198,269, leaving a profit of $360,262. The total length of water pipe in use in 1860 was 325⅓ miles.—Gas works were first constructed on a general scale in 1835; they were principally conducted by the authorities of the original city limits, and were very successful. In 1855 and 1856 the works owned by the municipalities were consolidated with those of the city proper; and in 1859 the works of two companies, previously independent, were purchased, bringing the whole service under the control of the city as its property. In 1860 the several works made 639,578,000 feet of gas, which was supplied to consumers at $2.25 per thousand feet. The total length of street mains is 383 miles; the total cost of the works $3,763,904; the profits of the business of 1860 were $408,435, exclusive of interest on the cost of the works. Great care was taken in the original establishment of the city gas works to secure the best improvements then effected in the manufacture of coal gas in European cities, and they have from the outset furnished gas cheaper than in any other American city.—The mint of the United States was founded at Philadelphia in 1792. It occupies a marble building in Chestnut street, erected at a cost of $200,000. It has coined up to June 30, 1860, of gold, $326,928,934; of silver, $93,951,766; of copper, $2,545,813; total coinage since 1793, $423,426,504. This is exclusive of coinage at the branches of the mint. The highest coinage of any year was $60,111,249 in 1853; the coinage of the year ending June 30, 1860, was $5,553,653. The amount coined varies very greatly, according to the course of exchanges, rather than the production of gold. In the early part of 1858 coinage was brisk for a few weeks, but generally the last 6 years have exhibited a coinage of less than $10,000,000 yearly, while from 1851 to 1854 inclusive the average was $50,000,000 yearly. Coinage is again rapid in the beginning of 1861, over $4,000,000 being coined per week at the first of February.—The system of street railroads for passengers only was introduced in its best form in Philadelphia in 1858, since which time 18 distinct roads have been laid within the city, having a total length of track of 155 miles. The plan of the streets particularly favors these roads in Philadelphia, and the fact that all are successful attests the immense use of them by the population of the city. They are laid with a broad rail as nearly as possible level with the pavement, and aid rather than hinder the use of the streets by carriages. The fare is uniformly 5 cents for any distance by one road, and 7 cents for an exchange ticket over two roads. The authorized capital of these roads is $8,500,000, but they were built at a cost of about $6,500,000. In 1860 they employed 500 cars, 3,000 horses, and 2,000 men. Cars for city railroads were built and sent to various parts of the United States, and even to England, during that year.—Several large market buildings, of a very superior character, have been erected in the city within 2 or 3 years past, generally by incorporated companies. There are 6 that contain from 300 to 500 stalls each, viz.: the eastern, 5th street; the farmers', Market street near 11th; the Franklin, 10th and Market streets; the western, 16th and Market streets; the union, 2d and John streets; and the farmers' western, 21st and Market streets. In parts of the city markets in the centre of the street still exist, owned by the city. For rents of markets the city in 1860 received $46,946.—There are 12 banks, with an aggregate capital of $12,106,855; 11 of these had, on Jan. 1, 1861, loans $26,991,290, specie $4,020,266, circulation $2,689,812, and deposits $15,261,925. The week's clearings were $17,805,734, and the balances $2,514,526. There are 15 savings banks, and 145 building, savings, and loan institutions. There are 3 incorporated commercial institutions, the board of trade, corn exchange, and merchants' exchange, each with halls, reading rooms, &c.—The business interests of the city are nearly equally divided between foreign commerce, manufactures, and the interior distributing trade. The value of foreign goods entered at the port of Philadelphia in 1860 was $15,190,755, and the estimated importation of steamer and other goods entered at New York by and for Philadelphia merchants was $30,000,000, of which $22,000,000 was foreign dry goods. The export to foreign ports from Philadelphia for 1860 was $7,843,510, the leading items of which were breadstuffs, provisions, and manufactures, each to the value of about $2,000,000. The coastwise commerce of the city is very large, and its export to other states of the Union is about $25,000,000 annually, and its coastwise import about $20,000,000. There were 592 foreign and 27,964 coastwise arrivals in 1860. The tonnage of the port on June 30, 1859, was 220,050; in 1860, 147 vessels were built, of 19,760 tons, and 84 foreign vessels were first measured, having 21,760 tons. The bar in the river below the city has 19 feet at low water and 25 feet at high water. The wharf front of the city has extraordinary depth of water, there being 57 feet at low water at the pier heads for half a mile, and not less than 30 feet for 3 m. of the river front. The occupied commercial front is 5 m. on the Delaware, and 1½ m. on the Schuylkill. There are 6 steam ferries to Camden and other suburbs across the Delaware, 3 leaving South street wharf, two from Market street, and one from Vine street. The number of steamboats plying up and down the Delaware between Philadelphia and the various towns is about 20. There are 14 steam lines to more distant points, the chief of which are the Boston line, two lines to New York, a line to Richmond, Va., one to Charleston, one to Savannah, two to Baltimore, &c. No regular trans-Atlantic steamship line now exists. A regular packet ship line to Liverpool employs 4 ships steadily; this was the first packet line established from the United States to that port. A number of sailing lines connect with southern ports. The coal trade outward employs 6,000 vessels, and in 1860 it carried 702,492 tons of coal to New England, 334,914 to New York, New Jersey, and Pennsylvania, 129,906 tons to the southern states, and 17,000 tons to foreign countries and California; total, 1,184,312 tons, worth on shipboard $4,250,000. The internal receiving and distributing trade is conducted on the Delaware and Raritan and Chesapeake and Delaware canals, which use capacious steam barges; on 4 railroad lines which reach the city from the east and New Jersey (the New Jersey central, by way of Trenton and the W. bank of the Delaware; the Camden and Amboy, at Camden; the Camden and Atlantic City; and the Camden and Cape May; the last just now (1861) completed), 3 railroads leading N. and W. (the North Pennsylvania, the Germantown and Norristown, and the Reading), and 4 leading S. and W. (the Pennsylvania central, the Westchester, the lower Westchester and Baltimore road, and the Philadelphia, Wilmington, and Baltimore). The weight of merchandise, mostly light goods, carried inland by railroad and canal, was about 400,000 tons in 1860. The central railroad alone carried 100,000 tons of through freight, and 67,000 tons of local freight westward from Philadelphia. The total value of goods sold to the interior was about $140,000,000, of which $78,000,000 was by jobbers of light goods. The railroads and canals carried to Philadelphia in 1860 very nearly 4,000,000 tons of coal, of the value of $14,500,000, and a heavy tonnage of produce, provisions, iron, and manufactured goods from interior works. The quantity of goods by the central railroad alone, exclusive of coal, was 278,780 tons; of which there was in cotton 14,336 tons, flour 52,000 tons, and grain 31,890 tons. The facilities for transacting heavy freight business are about to be increased by the extension of the central railroad across the lower part of the city to the Delaware.

city has from its foundation been conspicuously healthy. The separate municipalities constituting the aggregate city proved unfavorable to the preservation of order for a period of years previous to the consolidation. Minor riots were frequent between fire companies of the rival districts, and more or less of disturbance from this cause continued down to the better organization of the fire department in 1857. In 1835 riots were incited against the colored population, and again in 1838, when Pennsylvania hall, belonging to the anti-slavery societies, and occupied by their meetings, was burned by a mob. Other minor disturbances occurred from the same cause. In 1844 the districts of Kensington and Southwark were the scene of riots arising from the hostility between the Roman Catholics and "Native Americans;" the disturbance was protracted over a considerable time, the military were called out to enforce order, and some lives were lost.

PHILÆ, an island of the Nile in Nubia, just beyond the confines of Egypt, 6 m. S. of Aswan, in lat. 24° 1′ 34″ N., long. 32° 54′ 16″ E. It lies between the S. extremity of the island of Biggeh and the E. bank of the river, is a quarter of a mile long and about 500 feet broad, and is covered with picturesque ruins of temples, mostly of the times of the Ptolemies, with additions by the Roman emperors. These are principally at the S. end of the island. The chief temple is that of Isis, the portal of which bears the name of Nectanabis I., who reigned from about 374 to 367 B. C., while the wings were added by the Ptolemies a century or two later. Philæ is celebrated for its beauty, not only from its ruins, but from its palm trees and the grandeur of the surrounding scenery.

PHILEMON, an Athenian comic poet, born probably at Soli in Cilicia about 360, died in 262 B. C. He was the first writer of the new comedy in order of time, and inferior in celebrity only to Menander, from whom indeed he bore away the palm of victory in several dramatic contests. He began to exhibit plays about 330 B. C., and during his lifetime produced 97, of which not even the titles of many remain. The fragments of his extant works are usually printed in the principal editions of Menander. Philemon's subjects are chiefly love intrigues, and his plays are remarkable for their wit and elegance. According to one account, he died from immoderate laughter at seeing an ass eat figs from a countryman's basket; according to another, from joy at obtaining the prize in a dramatic contest.

PHILEMON AND BAUCIS. See BAUCIS.

PHILEMON, EPISTLE TO, a canonical epistle of the New Testament, written, according to the constant tradition of the ancient church, by the apostle Paul. Eusebius and Jerome attest its universal reception as a Pauline epistle in the Christian world, though the latter also remarks that, in consequence of the subject of which it treats, it was deemed by some in his day unworthy of a place in the canon. The Epistle to Philemon is one of the shortest portions of the Bible, containing only one chapter. It was written during Paul's imprisonment at Rome. After the usual introductory salutations, the apostle alludes to the good reputation which Philemon as a Christian enjoyed, and to the joy which the knowledge of this afforded him. He then introduces the main subject of the epistle. Onesimus, a servant or slave (δοῦλος) of Philemon, who had run away from his master, probably after having committed a theft, had been converted by Paul at Rome, and was sent back by him to his master, who is entreated to receive him "not as a servant, but as a brother beloved." Paul then pledges himself to make good any loss that Philemon may have suffered either through the dishonesty of Onesimus or through the want of his service; he requests Philemon to prepare him a lodging, as he trusted soon to visit him; and concludes with the salutations of some of his fellow laborers at Rome. The Epistle to Philemon has of late challenged in American theology particular study and comment, on account of its supposed bearing on the question of the relation of Christianity to slavery; and a number of religious organs in those states where African slavery exists have contested the correctness of the rendering of the Greek δοῦλος by "servant" in the common English version and in the new version of the American Bible union, insisting that "slave" would be the only correct rendering.—Of the life of Philemon nothing else is known. According to an ancient tradition, Appia, who is mentioned in verse 2, was his wife, and Archippus (in the same verse) his son. According to the Apostolical Constitutions he was bishop of Colossæ. The Roman Catholic church commemorates him as a saint on Nov. 22.

PHILIDOR. See DANICAN.

PHILIP II., the 18th king of Macedon, counting from Caranus, born in 382 B. C., assassinated at Ægæ in Aug. 336. The accounts of his early life are in many respects contradictory. He was the youngest son of Amyntas II. and Eurydice, and in 368 was given up by Ptolemy, then regent of Macedon, as a hostage to Pelopidas, who had marched into that country at the head of a Theban army. At Thebes Philip remained 2 or 3 years in the house of Pammenes, one of the principal citizens, and during his residence there undoubtedly acquired an intimate acquaintance with the strategetic art in its then most advanced state. When his brother Perdiccas had slain Ptolemy Alorites and had ascended the throne, he presented Philip, upon the advice of the philosopher Plato, with the government of a subordinate district. In 360 Perdiccas was slain in a battle with the Illyrians, and left the government in a distracted state. Beside the infant son of Perdiccas, the legal heir to the throne, there were claiming it his three half brothers, Archelaus, Aridæus, and Menelaus Pausanias, aided by a Thracian prince, and Argæus, assisted by the Athenians. Moreover, the country was threatened by incursions from the neighboring warlike tribes of Illyrians, Thracians, and Pæonians. Philip at first took charge of the government for his nephew Amyntas, but shortly after, probably in 359, ascended the throne himself, and immediately took vigorous measures to relieve himself from the difficulties by which he was environed. One of his half brothers he put to death; the other two saved themselves by flight. The Illyrians were bought off with presents and promises. The Athenians he contrived to detach to all intents and purposes from the support of Argæus, by withdrawing his garrison from Amphipolis, and declaring it a free city; and when that leader returned from his unsuccessful march upon Ægæ he was met at Methone by Philip and completely routed. The Athenian prisoners taken in the battle were treated with lenity and sent home, and these prudent measures, together with his pacific overtures, led to a treaty of peace between him and that people. Turning now his attention to nearer enemies, he subdued Pæonia, and in the same campaign reduced Illyria as far as Lake Lychnitis. These operations had taken up two years, and Philip, having freed himself from all danger of attack, began to act on the offensive. In 358 he commenced the siege of Amphipolis; and when ambassadors from that city implored the aid of the Athenians, their efforts were counteracted by the Macedonian envoys, who promised that the place if taken should be given up to Athens. Amphipolis fell, and Philip thus secured a convenient maritime port, commanding the country east of the Strymon, and in particular the gold region near Mt. Pangæus. The Athenians he continued to deceive with the promise of surrendering the city into their hands; and when the Olynthians, who now began to dread his growing power, sent embassies to Athens proposing an alliance, his partisans succeeded in having their proposals rejected. But while Athens was engaged in the sacred war, he suddenly formed an alliance with the Olynthians, and ceded to them Anthemus and Potidæa, the latter of which he had reduced. He had previously captured Pydna for himself, and although the siege of these places lasted long enough for aid to arrive from Athens, none came. Extending his conquests east of the Strymon, he took possession of the mining country opposite Thasos, and enlarged the city of Crenides, changing its name to Philippi. In the summer of 356, not long after the taking of Potidæa, three messages with good news reached Philip at once, informing him of the birth of his son Alexander, the defeat of the Illyrians by his general Parmenio, and the victory of one of his horses in the Olympic games. For a time he now laid aside active operations, but in 354 and 353 he began the siege of Methone, the only possession which Athens now held on the Thermaic gulf. After a vigorous defence the city at last surrendered, and Philip, master of this port, extended his incursions into Thrace, marching as far as Maronea, where he entered into negotiations against Athens with the Thracian prince Cersobleptes. He also threatened the Athenian possessions in the Chersonese, but was unable to reach them on account of the hostility of Amadocus, another Thracian prince. Turning his attention to Thessaly, he marched to the assistance of the Aleuadæ of Larissa against Lycophron, the tyrant of Pheræ; and the latter, unable to withstand the Macedonians, implored the aid of Onomarchus, leader of the Phocians, who sent into Thessaly his brother Phayllus with 7,000 men. Philip however defeated and drove him out of the country, whereupon Onomarchus, taking the field in person, marched into Thessaly, and routed the Macedonians in two battles, and with a loss so great that they were forced to withdraw into their own territory. After considerable difficulty in reviving the courage and devotion of his soldiers, Philip marched again into Thessaly, and, at the head of an army of 20,000 foot and 3,000 horse, signally defeated Onomarchus on the southern coast. He followed up this victory by the capture of Pheræ, which he made a free city, and of the maritime station of Pagasæ. He had on his march into Thessaly proclaimed himself the avenger of the Delphian god, and before the battle had decorated his soldiers with laurel wreaths. He now pushed on to the Phocian territory under the pretext of punishing the sacrilegious robbery of Delphi; but his entrance into that country was prevented by the Athenians, who guarded the pass of Thermopylæ. He now advanced toward the Chersonese, and began the siege of Heræum Teichos. The Athenians, alarmed by his rapid progress, made immediate efforts to equip a fleet for the defence of their possessions in that vicinity, but on a false report of his death they allowed their military operations to languish. About this time Demosthenes delivered his first philippic. Meanwhile the Olynthians, who had formerly been allies of Philip, now began to fear his power, and concluded a treaty with Athens about 352. No offensive operations on his part seem to have been begun until the middle of 350, when he seriously set to work to reduce the whole peninsula of Chalcidice, the pretext for the war against Olynthus being that his two half brothers had obtained a refuge in that city. The success of his arms in the peninsula was gradual but certain. City after city yielded to his power or was betrayed into his hands; and at last, master of Chalcidice, he marched directly against Olynthus and its two confederates, Apollonia and the Thracian Methone. Near the last named place he was wounded and lost the sight of one eye. Athens sent an expedition to the assistance of its ally, but the reënforcements were not sufficient to avail against the arts and arms of Philip. Olynthus was taken, probably early in the spring of

347, nearly as much by the use of money as by actual military strength. The inhabitants were sold into slavery, and Olynthus itself and the other cities of Chalcidice, 32 in all, were dismantled, and so thoroughly ruined that, according to a speech of Demosthenes 5 years later, their very sites were scarcely discernible. Athens now made a vigorous effort to unite the states of Greece in a common league against Macedon; but failing of much success, she listened to the overtures of peace which Philip indirectly offered. Negotiations were opened, which were skilfully protracted by Philip so as to subserve his own interests. The first embassy left Athens about Dec. 347, and returned about the beginning of March, bringing back a letter professing the most friendly feelings, but insisting as a condition of peace that each party should retain what it possessed. The treaty was adopted at Athens. But a dispute arose on the question of who were the allies included in the terms of the peace, the envoys of Philip refusing to acknowledge the Phocians as such. Before the second embassy reached him, he had conquered Cersobleptes, the Thracian prince and ally of Athens. The ratification of the treaty he delayed under various pretexts until he was at Pheræ, within 3 days' march of Thermopylæ. The Athenians, persuaded by Æschines and the other traitors of the Philippizing faction, did nothing for the defence of the pass. Phalæcus, the nephew and successor in command of Phayllus, thereupon concluded a convention with Philip, according to which he was to evacuate the territory with his mercenary soldiers, and with all Phocians disposed to accompany him; and the country fell immediately into the hands of the Macedonians. The amphictyons, assembling, invested Philip with the right of suffrage previously enjoyed by the Phocians, thus recognizing the Hellenic character of his nation; they moreover appointed him president of the Pythian games, which were held in Aug. 346, two months after the subjugation of Phocis. Athens, mortified and indignant at having been deceived and betrayed, was at first not disposed to concur in the vote giving him a place in the amphictyonic assembly, but was persuaded by Demosthenes not to display an anger at once dangerous and impotent. Master of Thermorpylæ, Philip now began his intrigues in the Peloponnesus, striving to excite the Messenians, Megalopolitans, and Argives against the Spartans. His active spirit was constantly at work throughout the whole of his dominions, confirming his authority in Thessaly, overrunning Pæonia and the Illyrian countries bordering upon Macedonia, and capturing cities on the Ambracian gulf. In 344 Athens, aroused by the eloquence of Demosthenes, sent embassies into the Peloponnesus to counteract his efforts, but they were attended with no success. Ill feeling prevailed between the Athenians and Macedonians for a long time before it broke out into open war. Philip began the siege of Perinthus in 340, but an Athenian fleet compelled him to retire; and a similar attempt to capture Byzantium failed in consequence of the presence of a fleet under Phocion, who moreover gained several advantages over him in land and naval actions. Philip therefore made peace with the Byzantines, withdrew his forces from that part of the country, and in the spring of 339 made a successful land expedition against the Scythian king Atheas; but on his return he was attacked by the Triballi, a Thracian tribe, defeated with the loss of his booty, and received a severe wound in his thigh. But about this time the amphictyons brought a new war into Greece, by resolving that the Amphissian Locrians, who had settled on the Cirrhæan plain, consecrated to the Delphian god, were to be punished for impiety. Philip was called in to execute the decree. He immediately began the march southward, and on his passage through Phocis seized Elatea and commenced refortifying that town. He declared his purpose to invade Attica, and sent envoys to Thebes, where a strong feeling against Athens prevailed, asking her assistance, or at least that a free passage through Bœotia should be granted. By the eloquence of Demosthenes, Thebes was persuaded to enter into an alliance with Athens, and the allied forces kept the field against Philip during the autumn and winter of 339 and 338, and gained over him several advantages. In Aug. 338, the battle of Chæronea was fought, in which Philip was signally victorious. The conquered Thebans he treated with severity, but motives of policy led him to adopt mild measures in regard to the Athenians, between whom and himself the treaty called the peace of Demades was negotiated, by which the Athenians recognized Philip as the head of Greece, and thus the great object of his ambition was secured. He now carried his arms into the Peloponnesus, and reduced the entire country, with the exception of Sparta, which it seems he did not attack. He held a congress of Grecian cities at Corinth, in which he unfolded his design of invading the Persian empire, and liberating the Asiatic Greeks. The congress voted him the leader of the Greeks, and decreed that the various states should furnish contingents. During 337 his preparations for the expected invasion went steadily on, and early in 336 a body of troops under Attalus and Parmenio was sent over into Asia. Not long before he had repudiated his wife Olympias, the mother of Alexander, on the ground of infidelity, and had married Cleopatra, the niece of Attalus. At the wedding banquet, incensed by a remark of Alexander, he tried to slay him, but, overcome by passion and drunkenness, fell to the floor. Alexander hereupon exclaimed: "Here is a man preparing to cross from Europe into Asia, who yet cannot step surely from one couch to another." He subsequently conducted his mother to her brother Alexander, king of Epirus. Afterward a reconciliation was effested between him and his father. To retain the good will of the king of Epirus while he himself was in Asia, Philip gave him his daughter in marriage; and festivities of great splendor were celebrated at Ægæ in Macedonia. Among the members of his body guard was a noble youth named Pausanias, who had in vain implored Philip to avenge an outrage committed by Attalus. Indignant at his failure, his hatred turned against his king, and his determination to assassinate him is said to have been encouraged by Olympias. As Philip was entering the theatre, Pausanias rushed forward and thrust a sword through his breast, killing him almost instantly. The assassin attempted to escape, but was overtaken and slain on the spot.—Philip was a man of great courage and activity, possessing military and diplomatic talents of the highest order. "Singularly fortunate, throughout the whole of his life, in being opposed to no great military leaders, he extended his conquests as much by corruption as by arms. He was of a strongly sensual temperament, as is evident from the number of his wives and concubines, was unscrupulous in his dealings, and careless of his promises. His patronage of literature and science was liberal. In addition to a manly presence and a powerful frame, he had a "ready eloquence, to which art only applied the cultivation requisite to satisfy the fastidious demands of a rhetorical age; quickness of observation, acuteness of discernment, presence of mind, fertility of invention, and dexterity in the management of men and things."

PHILIP V., king of Macedon, son of Demetrius II., born in 237 B. C., died in 179. His father died when he was 8 years old, but he did not succeed to the throne until the death of his uncle Antigonus Doson in 220. In the first year of his reign he was brought into the war then raging between the Ætolians and the Achæan league. Marching to Corinth with an army for the support of the latter, he presided over an assembly of the allied states in which war was declared against the Ætolians, and in the spring of 219 entered Epirus, but quickly returned to repel an invasion of the Dardanians. At the close of the year he suddenly showed himself in the Peloponnesus, and in a short campaign defeated an Ætolian and Elean army under Euripidas, captured Psophis, ravaged the Elean plain, and conquered Triphylia. In 218 he suddenly passed over into Ætolia, and took Thermus, the capital of that country, with all its treasures; and then, turning to the Peloponnesus, ravaged Laconia and defeated the Spartans under Lycurgus. The next year he captured Bylazora in Pæonia, and reduced the Phthiotic Thebes in Thessaly, but finally concluded a peace by which it was agreed that each party should retain what it possessed. At this time Philip began to turn his attention to the war then waged in Italy by Hannibal, and after the battle of Cannæ sent a messenger to conclude an alliance with the Carthaginian leader; but owing to the ambassador being intercepted by the Romans, the treaty was not made until 215. In 214 his fleet appeared in the Adriatic, took Oricus and laid siege to Apollonia, but was obliged to retreat on the arrival of a Roman force under Lævinus. The next year, however, he took Lissus and reduced the greater portion of Illyria. Meanwhile the character of Philip seemed to suffer a great change. In the beginning of his reign he had not only manifested military talents of a high order, but had been so distinguished for his moderation and generosity that the cities of Crete had placed themselves of their own accord under his protection. But now he broke with Aratus, his former friend and counsellor, and in 214 ravaged Messenia with fire and sword. In 211 an alliance was entered into against him by the Romans, the Ætolians, Scerdilaidas, king of Illyria, and Attalus, king of Pergamus. The war began in 210 and lasted until 205; and upon the whole Philip was successful, as the Romans were too much engaged with their Carthaginian war to render much assistance to their allies. The terms of the treaty were not much respected by the Macedonian king, who formed an alliance with Antiochus against Egypt; and having inflicted several injuries on the Rhodians, he became involved in a war with that people and Attalus. While besieging Chios, he was attacked and defeated by the combined fleet; but in another engagement off Lade, he was successful. The allies however equipping another fleet, it was with some difficulty that Philip was able to pass over into Europe in the spring of 200. The Romans, now free from their war with Carthage, listened to the complaints of the Rhodians, Attalus, and the king of Egypt, and declared war against Macedon. The contest was carried on until 196, at first somewhat to the advantage of Philip. In 200 he invaded Thrace, took Ænus and Maronea, penetrated into the Chersonese, captured Abydos, and returning entered Attica, nearly surprising Athens; but being foiled in this, he laid waste the country around the city. The following year he defeated the Ætolians, who had joined the Romans. The arrival of Titus Quintius Flamininus to take the command of the Roman army soon changed the aspect of affairs. A battle was fought in 197 at Cynoscephalæ in Thessaly, in which the Macedonians were defeated with a loss of 8,000 men killed and 5,000 taken prisoners. A peace was concluded in 196, according to the terms of which Philip was required to give up all his conquests in Europe and Asia, surrender his fleet to the Romans, reduce his standing army to 5,000 men, and pay the sum of 1,000 talents. One of the hostages for the fulfilment of these terms was his son Demetrius. Philip now acted outwardly as a zealous ally of the Romans, assisted them in their war against Nabis, king of Sparta, and subsequently not only refused to join Antiochus, but aided the Romans in their war with that monarch. So thoroughly were they satisfied with his conduct, that the portion of the fine unpaid was remitted, and his son Demetrius was sent home. But after the defeat of Antiochus they grew jealous of Philip, who was strengthening his power in every quarter. He was compelled to give up all his conquests in Perrhæbia and Thessaly, remove his garrisons from the cities of Thrace, and restrict his authority to the ancient boundaries of Macedonia. Demetrius was sent to Rome, and was received with so much favor and procured such advantageous terms that the jealousy of his brother Perseus was excited. The life of Philip was henceforth embittered by the dissensions between his two sons. In his domestic administration he also became more cruel, while he was engaged in secret preparations for renewing the war against the Romans. In an expedition into Pæonia, Perseus by means of forged letters succeeded in inducing his father to put Demetrius to death. The unhappy king was now overcome with grief and remorse, which were increased when he found that he had been deceived. He thought that he was haunted by the avenging spirit of Demetrius, and not long after died, in his last moments cursing his son Perseus.—Polybius said of Philip, that there were few monarchs of whom more good or more evil could justly be spoken. The early age at which he ascended the throne thwarted the development of his naturally good qualities, so that during the latter years of his reign he became tyrannical, perfidious, and cruel. In conversation he was a ready speaker, and possessed great power of repartee. In private life he was exceedingly licentious and fond of excessive drinking.

PHILIP II. Augustus, king of France, the 7th monarch of the Capetian line, born Aug. 22, 1165, died in Mantes, July 14, 1223. He was the son of Louis VII., was crowned at Rheims during the lifetime of his father, whom he succeeded in the following year (1180). His marriage with the daughter of the count of Hainault united the races of Capet and Charlemagne, and a second coronation was performed at St. Denis. He immediately banished all the Jews, confiscated their property, and persecuted the Waldenses. When his wife died without issue, the count of Flanders, her uncle, refused to give up Amiens, a part of her dowry, and a war broke out, in the course of which the count marched to the gates of Paris (1184). Philip, however, ultimately secured Amiens and nearly all of Vermandois. He was next involved in a war with the duke of Burgundy, who disputed his authority, and with Henry II. of England, whose sons he supported against their father. In 1188, on hearing of the fall of Jerusalem, he assumed the cross, and in 1190 the allied forces of France and England started on the third crusade. They reached the Holy Land in 1191, but, outshone by his rival Richard I., Philip soon returned to Europe, swearing on his departure to respect the dominions of the English king. Nevertheless, he soon found a pretext for invading Normandy, and made some conquests, while Richard was a prisoner in the hands of the emperor of Germany; but in 1194 he was repulsed from Rouen. After Richard's release a war, marked by no great military or political events, began between the two monarchs, and lasted till the death of Richard in 1199. The statesmanship of Philip in the end proved too much for the more soldierly qualities of the English king. During this war Philip recalled the Jews, being in need of money. Having divorced his second wife, and, in defiance of a papal bull, married in 1196 Agnes of Meran, a princess of the Tyrol, he was excommunicated, and his kingdom laid under an interdict. The death of Agnes of Meran enabled him to reconcile himself with the church, and the murder of Arthur by King John afforded him a plausible pretext for renewing the war with England. He summoned John to appear at his court and answer for the crime, and on his failing to do so adjudged him guilty of felony, and declared his dominions confiscated. Normandy was conquered in 1203, and Maine and Anjou soon afterward; and though Poitou and Guienne were not effectually subdued until the reign of Philip's son, the power of the English was broken. In Oct. 1206, a truce of two years was concluded, which Philip employed in strengthening his power, and developing the material resources of his dominions. About this time the crusade against the Albigenses began in the south of France, where the king scarcely exercised even nominal authority. Its early success encouraged the pope to excommunicate John, with whom a dispute had arisen, and to present England to Philip. Immense preparations were made for an invasion, but the French king was diverted from the execution of his purpose by the insubordination of Ferdinand, count of Flanders. He invaded the dominions of his vassal in 1213, and committed great ravages; but his fleet was defeated and destroyed at Dam by the English, under command of the count of Boulogne and the earl of Salisbury. The next year he was attacked on the side of Poitou by John, and on the side of Flanders by the nobles of the Low Countries commanded by Otho, emperor of Germany. John was beaten off by the dauphin Louis, and Otho was defeated in the battle of Bovines between Lille and Tournay, in which the counts of Boulogne and of Flanders were taken prisoners. After this the life of Philip is marked by no events of great military importance, except the expedition of his son Louis to England, to take possession of the crown of that country, to which he had been invited by a portion of the barons. Louis became master of nearly all the south, but in 1221 was obliged to leave the country. Philip himself took little interest in the military expeditions in which his son afterward engaged, devoting himself chiefly to the civil administration and the management of his revenues, amassing great wealth, which he divided among several legatees. He was the ablest king that had sat on the throne of France since the time of Charlemagne. The kingdom, limited at his accession to the Île de France and portions of Picardy and Orléanais, included in 1206 in addition all or nearly all of Vermandois, Artois, the Vexin-Français and the Vexin-Normand, Berri, Normandy, Maine, Anjou, Touraine, Poitou, and Auvergne. But it was less as a soldier than as an administrator that he was distinguished. He succeeded in part in establishing a central power by assembling about him a parliament of his grand vassals, of which he himself as suzerain was the head. He was still more successful in his efforts to free royalty from the power either of the pope or of the national clergy. In 1209 he seized the domains of the bishops of Orléans and Auxerre, who had refused their contingent dues for the fiefs they held, and, in spite of a papal interdict, compelled the prelates to admit his claim. He caused the streets of Paris to be paved, extended and heightened the walls, constructed numerous public buildings, conferred its chief privileges upon the university of Paris, and walled in and strengthened the principal towns of his kingdom. He favored the rights of the communes in the municipal towns, and his popular policy led them to prefer the government of the crown to that of their feudal lords. Under him royal power connected itself with social and material progress, and the French people made rapid advances toward consolidation into one nation.

PHILIP IV., the Fair, the 11th king of France of the Capetian line, born at Fontainebleau in 1268, died there, Nov. 29, 1314. He succeeded his father, Philip the Hardy, in Oct. 1285, and was crowned at Rheims in Jan. 1286. The beginning of his reign was disturbed by the war with Aragon begun in 1283, but this was speedily settled. He had long been meditating the invasion of Guienne, then held by Edward I. of England, when in 1292 a sort of piratical war waged between the sailors of the cinque ports and France gave him a pretext for summoning that monarch before the parliament of Paris. The English king, acknowledging the suzerainty of Philip, but detained by his contests with the Welsh and Scotch, sent his brother Edmund with full powers of negotiation; and this credulous prince was so outwitted through a fictitious treaty, that the surrender of all the fortresses in Guienne was procured. Philip then charged Edward with contumacy for not appearing in person, and declared his fiefs confiscated. The latter formed an alliance with the German emperor, Adolphus of Nassau, and the count of Flanders. A truce was however agreed upon, by the terms of which the question of Guienne was referred to the decision of the pope. In 1299 Flanders, which had not been included in the treaty, was reduced, and its count enticed to Paris and imprisoned. The dominions of Philip were now nearly equal to those of France in subsequent centuries. He engaged in a quarrel with Pope Boniface VIII., and in 1302 summoned a meeting of the states-general, in which it has been stated, but erroneously, that the *tiers état* were for the first time recognized. A rebellion broke out in Flanders, and in attempting to suppress it the French were defeated with terrible slaughter at Courtrai, July 11, 1302. The next year Philip marched into the Flemish territory at the head of a large army, but was unable to effect any thing; and about this time the expulsion of the French garrison from Bordeaux led to the restoration of Guienne to England (1303), and to a treaty of peace between the two crowns. In the mean while, his quarrel with the pope continuing, Philip summoned a meeting of the prelates and nobles, and accused Boniface of heresy, simony, sorcery, sensuality, and disbelief in the eucharist and in the immortality of the soul. An appeal to a general council was adopted. But Philip, trusting more to force than to pacific measures, sent into Italy William of Nogaret, who by the aid of the Colonnas made the pope prisoner; and although Boniface was released by a rising of the people, he shortly afterward died, probably from ill usage. He was succeeded by Benedict XI., who did not live long, and in turn was succeeded by Clement V., a pontiff wholly in the French interest, who transferred the papal residence to Avignon. Philip now prosecuted his Flemish war with fresh vigor, but little success, and a treaty of peace was finally concluded in 1305, by which the independence of Flanders was partially recognized. Actuated, it is supposed, by want of money, which had previously led him to persecute the Jews and depreciate the coinage, Philip next resolved to suppress the order of the templars. Charges of the most serious nature were brought against the body, and in Oct. 1307, all the knights of the order were arrested on the same night. Condemned by diocesan tribunals, numbers of them were burned, and others, who through fear of torture or death had confessed, were sentenced to minor punishments. To sanction the suppression of the order, the council of Vienne assembled in Oct. 1311, and in the spring of 1312 the pope pronounced it dissolved, and its property made over to the hospitallers. It did not however prove a very valuable endowment, the exactions and claims of the king's officers in the sequestrations being so enormous that the crown absorbed the greater portion of it. In 1314 two leading officers of the templars, Guy of Auvergne and the grand master Jacques de Molay, were burned for recanting their confessions; and on this occasion, it is said, the grand master summoned the pope and the king to appear before the judgment seat of God, the former within 40 days, the latter within a year and a day. Whether this summons was real or imaginary, both sovereigns died within the specified periods. The last years of Philip's life were taken up with the collection of taxes, and prosecutions and executions for political offences. In 1313 the wives of his three sons were charged with adultery; one of them was sentenced to perpetual imprisonment, and one, Margaret of Burgundy, wife of his eldest son Louis, was strangled in prison, while the third was acquitted. Involved in new difficulties with the Flemings, he was obliged by an insurrection of his own people to make a compromise with them. During his whole reign he was governed by the legists, who steadily strove for the overthrow of the feudal system, and to strengthen and render independent the royal authority. His power was of the most despotic character, and there was often much disaffection among the people in consequence of the enormous taxes and debasement of the coinage.

PHILIP VI. OF VALOIS, the 15th king of France of the Capetian line, and first of the house of Valois, born in 1293, died in Nogent-le-Roi, near Chartres, Aug. 22, 1350. He was the son of Charles of Valois, brother of Philip the Fair, and during the reign of Philip the Long headed an unsuccessful expedition against the Ghibelline party in Lombardy. On the death of Charles the Fair in 1328 without a male heir, though his widow was pregnant, Philip was intrusted with the regency. When the queen was delivered of a daughter, who was excluded by the Salic law from the throne, the right to the succession became a matter of dispute; but at last it was settled on Philip, who was crowned at Rheims, May 29, 1328. The same year he undertook an expedition against the Flemings, whom he defeated with considerable loss, and took the city of Cassel. The next few years were occupied in the civil administration of France, regulating the currency, settling disputed boundaries, and especally in determining the claims of Robert, count of Beaumont, to Artois. The pretensions of Robert were not admitted, and that prince, banished from the realm in 1330, took refuge in England. Philip entertained the project of a crusade against the Moors of Granada, but the demands he made of the pope were so exorbitant, that the matter came to nothing. In the mean while the assistance which he rendered to Robert Bruce, king of Scotland, irritated Edward III. of England, who claimed to be the heir of the French throne, and a war broke out in 1337, Edward forming an alliance with the Flemish burghers under James Artevelde. This war, which lasted through the reign of Philip, proved most disastrous to the French. In 1342 Philip issued an ordinance making salt a government monopoly. In Aug. 1346, Philip was defeated at Crécy by Edward III., who took Calais the next year. In 1348 the ravages of the plague prevented a general renewal of the war. Philip was somewhat compensated for his losses both from war and disease by the addition to the French dominions of the province of Dauphiné. In 1350 he espoused the princess Blanche of Navarre, but soon after died. He was succeeded by his son John II.

PHILIP II., king of Spain, born in Valladolid, May 21, 1527, died at the palace of the Escurial, Sept. 13, 1598. His father was Charles V., emperor of Germany and king of Spain, and his mother the empress Isabella, daughter of Emanuel the Great of Portugal. He was carefully educated, and showed some taste for science and the fine arts, especially for mathematics and architecture. Even in childhood he was thoughtful, cautious, and reserved. His father kept him surrounded by able statesmen, who early familiarized him with ideas of government. At the age of 16 he was married to his cousin the infanta Maria, daughter of John III. of Portugal, who died within two years, a few days after giving birth to the celebrated and unhappy Don Carlos. Philip was married a second time, July 25, 1554, at Winchester, to Mary, queen of England, with whom his father had negotiated the match. To make the husband equal to the wife in rank, Charles resigned to his son the kingdom of Naples and the duchy of Milan. The marriage was not a happy one, for Mary was very ugly, and Philip, though she doated on him with the most passionate fondness, treated her with coldness and was notorious for his infidelities. After a residence of somewhat more than a year in England, he was summoned to Flanders by his father, and in Sept. 1555, reached Brussels, where on Oct. 25 was fulfilled the famous act of abdication by which Charles transferred to Philip the sovereignty of the 17 provinces of the Netherlands. Three months later, Jan. 16, 1556, the emperor also ceded to his son all his remaining hereditary dominions, and shortly afterward resigned the elective crown of the German empire in favor of his brother Ferdinand. By his father's abdication Philip thus became sovereign of the most powerful and extensive empire in the world, including, beside the Netherlands, a great part of Italy, the whole of Spain, and the vast Spanish possessions in America, Africa, and the East Indies. He is described at this time as a small, meagre man, much below the middle height, with thin legs, a narrow chest, and the shrinking, timid air of a habitual invalid. He had a heavy, hanging lip, with a vast mouth and monstrously protruding lower jaw. His complexion was fair, his hair light and thin, his beard yellow, short, and pointed. He had the face of a Fleming with the manners of a Spaniard. He looked constantly on the ground when he conversed, was chary of speech, embarrassed and even suffering in manner. "This was ascribed," says Motley, "partly to a natural haughtiness which he had occasionally endeavored to overcome, and partly to habitual pains in the stomach occasioned by his inordinate fondness for pastry." He was considered by his contemporaries at that period to be sluggish in character and deficient in mental capacity. He had, however, an inclination for business amounting almost to a passion, and was an indefatigable writer of despatches, spending nearly all his time in his cabinet with his ministers and secretaries. His main object in life was to support and advance the Roman Catholic religion, of which he was a most devoted adherent. His ambition for the aggrandizement of his empire was always subordinate to his concern for the church; and he was accustomed to say: "Better not reign at all than reign over heretics." But although his piety and his position at the head of the Roman Catholic princes of Europe made him the natural ally of the pope, one of the first events of his reign was a war with Paul IV., who then occupied the papal throne. The pope had formed an alliance with Henry II. of France and with Solyman the Turkish sultan, the latter of whom agreed to make a descent on the Italian dominions of Philip, while a powerful French army led by the duke of Guise entered Italy for the conquest of Milan and Naples. Philip had intrusted the government and defence of the latter kingdom to the duke of Alva, and that able and experienced soldier in one campaign carried his arms to the walls of Rome, and in another drove the French out of Naples and compelled the pope to sue for peace, which was concluded Sept. 14, 1557. Meantime Philip in person was vigorously prosecuting hostilities in the northern provinces of France, having by his influence with Mary induced England to declare war against that country. Under his direction a powerful army, the actual commander of which was Emanuel Philibert, duke of Savoy, assisted by William of Orange, Egmont, and other officers of distinction, entered Picardy and laid siege to St. Quentin. A French army commanded by the constable de Montmorency, attempting to relieve the place, was defeated, chiefly by the brilliant valor of Egmont, in a decisive battle fought Aug. 10, 1557, the day of St. Lawrence; and in honor of that martyr, to whose interposition he ascribed the victory, Philip subsequently built the convent and palace of the Escurial. Two thirds of the French army were killed or taken prisoners. The town of St. Quentin soon after the battle was taken by storm. Other victories over the French rapidly succeeded, but the jealousies of his English and German allies prevented Philip from pressing his conquests by marching on Paris. In the following year the French under Marshal Termes invaded Flanders, and were signally defeated in the battle of Gravelines by a Spanish and Flemish army commanded by Egmont, who much enhanced by this achievement the reputation he had gained in the campaign before St. Quentin. These defeats induced the French king to accede to terms of peace, which were finally settled (April 2) by the treaty of Câteau Cambrésis, which was highly favorable to Philip and greatly raised his reputation in Europe as a sovereign and as a diplomatist. While negotiations were going on his wife Mary of England died, Nov. 17, 1558. Very soon after her death Philip made offers of marriage to her successor Queen Elizabeth, which were rejected. Philip did not take the refusal greatly to heart, and speedily sought and obtained the hand of the princess Elizabeth, or Isabella, daughter of Henry II. of France, who at the late treaty had been promised to Philip's son Carlos, for whom in years she was a much more suitable match than for his father, the prince and the princess being at that time both about 14. The marriage was celebrated at Paris, June 24, 1559, the duke of Alva acting as his sovereign's proxy. A few weeks later Philip sailed from the Netherlands to Spain, where he afterward always resided, and where he was joined by his bride early in the following year. He left the government of the Netherlands in the hands of his half sister Margaret, duchess of Parma, as regent, assisted by a council composed in part of William of Orange, Count Egmont, and Antoine Perrenot, bishop of Arras, subsequently better known as Cardinal Granvelle. Philip had not been many days in Valladolid, where the court then resided, Madrid not being made the capital till 1562, before he signalized his devotion to the church by attending an *auto de fé*, at which by order of the inquisition 14 Protestants were burned at the stake, two of them men of high rank and distinguished talents, Don Carlos de Seso and Don Domingo de Roxas. As the victims were led past the gallery in which the royal family sat to witness the spectacle, De Seso called out to Philip: "Is it thus that you allow your innocent subjects to be persecuted?" Philip replied: "If it were my own son, I would fetch the wood to burn him were he as wicked as thou art." In this spirit, soon after his return to Spain, Philip began to take measures for extirpating heresy in the Netherlands, where the doctrines of the reformation had already made great progress. For this purpose he had in conjunction with the pope added 14 new bishoprics to the 4 already existing in these provinces. This step caused great excitement among the Netherlanders, who looked upon it as but the prelude to the overthrow of all their rights and privileges and their complete subjection to the inquisition, which had already crushed Protestantism in Spain, and was now busily at work among themselves. The popular opposition to this and other measures of the Spanish court was led by Orange, Egmont, Horn, Montigny, and other eminent and influential nobles, some of whom were Catholics. Their energetic protests compelled Philip in 1564 to withdraw Granvelle from the country, the odium of these proceedings being popularly fixed on that prelate. The persecution of the Protestants was however continued, and in 1566 it is recorded that 17 were publicly burned at the stake. The people at length rose in insurrection, and in 1567 the cruel duke of Alva was sent with a powerful army to repress the rebellion and extirpate the heretics. Under the rule of this tyrant the most terrible barbarities were inflicted on the Protestants. Egmont and Horn and several other great nobles were arrested and beheaded, and during his administration of 6 years 18,000 persons perished on the scaffold, beside immense numbers put to death in battles, sieges, and massacres. This ferocity however failed to subdue the insurgents, who under the wise leadership of William of Orange maintained a heroic and generally successful struggle against Alva and his successors, Requesens, Don John of Austria, and the duke of Parma. In 1579 the seven United Provinces formed the union of Utrecht, and during the rest of Philip's reign maintained their independence and carried on a vigorous war with the Spaniards by land and sea. Among the remarkable incidents of this long contest was one strongly illustrative of Philip's character—the secret execution of the lord of Montigny, the younger brother of Count Horn. He was sent to Spain in 1566 by the nobles of the Netherlands as an envoy to the king to lay before him the real state of the provinces. Philip received him at first graciously, but detained him, and in Sept. 1567, committed him as a prisoner to the fortress of Segovia, and afterward to that of Simancas, where, in Oct. 1570, he was strangled in so secret a manner that his fate remained a mystery till a few years ago, when the opening of the archives of Simancas, in which the king's correspondence with his ministers had been deposited, disclosed the fact that Philip in his own handwriting had given the most minute directions for the murder and for its subsequent concealment by giving out that Montigny had died of a fever. The unfortunate nobleman, though he opposed the persecution of the Protestants, was a devout Catholic; and Philip, in communicating in a private despatch to Alva the real circumstances of his death, says: "If his inner man was penetrated with as Christian a spirit as he exhibited in the outer, and as the friar who confessed him has reported, God, we may presume, will have mercy on his soul." Another remarkable transaction, in which the personal agency and character of Philip may be clearly traced, was the assassination of William of Orange, the great leader of the revolt of the Netherlands. Against this eminent statesman and hero the king issued in 1580 a formal ban, declaring him an outlaw and an enemy to the human race: "And if any one of our subjects or any stranger shall be found sufficiently generous of heart to rid us of this pest, delivering him to us alive or dead, or taking his life, we will cause to be furnished to him, immediately after the deed shall have been done, the sum of 25,000 crowns in gold. If he have committed any crime, however heinous, we promise to pardon him; and if he be not already noble, we will ennoble him for his valor." Incited by this proclamation, various assassins attempted to kill the prince; and at length a Burgundian fanatic, Balthasar Gérard, having previously made known his design to the prince of Parma, who communicated it to Philip, murdered Orange at Delft, in 1584. Gérard was taken and put to death, but Philip rewarded his heirs with estates of great value and with patents of nobility. "Had it only been done two years earlier," said he on hearing of the murder, "much trouble might have been spared me; but 'tis better late than never." During the earlier part of the war with the Netherlands, Philip carried on almost constant hostilities against the Mohammedans. The famous siege of Malta by the Turks in 1565 was raised by his forces sent from Sicily. His persecution drove the Moors of Granada to a revolt in 1568, which was suppressed with rigorous barbarity. It was followed in 1571 by a war with the Turks, the principal event of which was the great naval victory of Lepanto, won by Philip's brother Don John of Austria, in which the Ottoman fleet was nearly annihilated. In 1578–'80, by the death of Dom Sebastian and of Henry the cardinal, the throne of Portugal became vacant, and Philip, as uncle of Sebastian, claimed the crown, and sent Alva with an army to enforce his right. This was successfully effected, and in 1581 Philip was recognized by the Portuguese estates as rightful sovereign of the kingdom. After the death of Orange, he bent all his energies and resources to the conquest of England, from which the Netherlands were continually receiving assistance in men and money. After long preparation the "invincible armada" was sent for this purpose in 1588, and was completely foiled and vanquished, partly by the elements, and partly by the English fleet commanded by Lord Howard, Sir Francis Drake, and other distinguished leaders. (See ARMADA.) Philip received the news of this terrible disaster with composure. "The will of God be done," he said; "I sent my ships to fight with the English and not with the elements." The relations of Philip with France during his long reign had been sometimes warlike and sometimes peaceful, but both his arms and his money were freely given to aid the Catholics of that kingdom against the Huguenots. He continued his hostility against Henry IV. even after that monarch had become a Catholic, and his intrigues led Henry in 1595 to declare war against him. The contest was not favorable to Spain, and in 1597 Philip was reluctantly compelled to consent to the peace of Vervins. In the next year a complication of distressing maladies, the consequence of early debaucheries, caused his death, which took place in the palace of the Escurial, which he had himself built, and which still remains the most magnificent monument of his power and wealth. One of the strangest transactions of Philip's reign was his treatment of his eldest son Don Carlos, which has frequently since afforded a favorite theme for historians, poets, and romancers. It was commonly believed until recently that the prince had been put to death by command of Philip, but the researches of Prescott and of other recent historians have shown that Don Carlos was probably insane, and that after vavious outrages on his father's friends and ministers he had formed the design of taking the king's life, and was consequently arrested and kept in confinement till he died about 6 months afterward of a fever brought on and heightened by the most extravagant recklessness of diet and exposure. Within 3 months after the death of Carlos his stepmother Queen Isabella died, it was reported at the time by poison administered by Philip's order. This calumny has also been refuted by recent researches, and it is now known that she died in giving birth to a daughter who did not survive her, and was buried in the same coffin. The queen died in 1568, and in 1570 Philip married as his fourth wife the archduchess Anne of Austria, daughter of the German emperor Maximilian II., who became the mother of his successor Philip III.—See Prescott's "History of Philip II." (3 vols., Boston, 1856–'9), and Motley's "Rise of the Dutch Republic" (3 vols., New York, 1856), and "History of the United Netherlands" (2 vols., New York, 1861).

PHILIP V., king of Spain, the first of the house of Bourbon in that country, born at Versailles, Dec. 19, 1683, died July 9, 1746. The 2d son of the dauphin Louis by Maria Anna of Bavaria, and a pupil of Fénelon, he was known as duke of Anjou until by the will of Charles II., who died childless, he was called to the throne of Spain, Oct. 2, 1700. In the following month he was declared king at Fontainebleau by his grandfather Louis XIV., and proclaimed at Madrid. His arrival in the peninsula was hailed with lively manifestations of popular satisfaction, while his power was acknowledged in the kingdom of Naples, Milan, the Netherlands, and the Spanish colonies of America. No opposition was offered to his accession by any European power except the house of Austria and the empire, who protested against the will of Charles II., and prepared for war. Philip nevertheless seemed to be firmly established, winning the favor of his subjects by attention to his duties, curtailment of useless offices, reform of abuses, and personal affability. But the rashness of Louis XIV., who, in contravention of express stipulations, endeavored to secure to his grandson the right of succession to the crown of France, alarmed Europe. A league between Austria, Holland, Great Britain, the empire, and Prussia was formed against France and Spain, to uphold the claims of the archduke Charles to the Spanish crown. The only allies of Philip V. at the opening of the contest were his uncle the elector of Bavaria, the duke of Savoy, whose daughter Louisa Maria Gabriella he had married, and the king of Portugal; but the last two were soon detached from his alliance by promises of territory, and finally joined the above coalition. The war opened in 1701 in Italy, where Prince Eugene at the head of Austrian troops gained the victories of Carpi and Chiari. Philip repaired to Italy in person and shared in the victory of Luzzara, Aug. 15, 1702, but was obliged to return in haste to Spain, which was attacked by the combined troops of Great Britain and Holland. The archduke landed in Portugal in 1704; and the king, marching against him, defeated the Portuguese on the frontiers, but was unable to retake Gibraltar, which had been captured by Admiral Rooke, Aug. 4, 1704. During 1705 the provinces of Valencia, Catalonia, and Aragon acknowledged the archduke, whom Philip unsuccessfully besieged in Barcelona. The disorganization of his army obliged him to retreat to Perpignan, but he soon reëntered Spain, and through Navarre and Old Castile returned to Madrid, where his presence was sorely needed. Scarcely had he reached the capital, however, when the approach of Lord Galway and the marquis of Las Minas forced him to retreat to Burgos, accompanied by a small band of faithful adherents; while the archduke, under protection of the English and the Portuguese, was proclaimed king with the title of Charles III. Philip's affairs were now so desperate that he was advised to emigrate to his American dominions; but, encouraged by his wife and the princess des Ursins, he refused to abandon the field, and rejected the overtures of peace that were made by his opponents. His constancy soon had its reward; supported by Marshal Berwick, whose skill and valor retrieved his fortunes, he reëntered Madrid after an absence of scarcely 9 months, and was reinstated on the throne by Berwick's brilliant victory at Almanza, April 25, 1707. The successful operations of the duke of Orleans in Valencia, Aragon, and Catalonia consolidated his power; but that commander, being charged by the princess des Ursins with views of personal aggrandizement, was recalled to France; and Philip's success in Spain was checked, while abroad he lost Sardinia and Port Mahon in 1708. In the campaign of 1709, however, Tortosa, Denia, and Alicante were taken by his troops; but in the following year the two victories of Count Stahremberg enabled Charles III. to return to Madrid, whence Philip had again to fly. The timely arrival of Vendôme from France gave another favorable turn to affairs, and in company with that brilliant general Philip boldly advanced to the capital, expelled his competitor, and reëntered it, Dec. 3, 1710. The decisive battle of Villaviciosa, fought Dec. 10, was the signal of his definite triumph. Catalonia and Aragon were reconquered, and the archduke having meanwhile by the death of his brother become emperor, the greatest obstacle to peace was removed, the European powers being unwilling to restore the vast monarchy of Charles V., and Philip V. on his part assenting (Nov. 5, 1712) to a formal renunciation of his claims to the French succession. By the treaty of Utrecht he remained master of the kingdom of Spain, Spanish America, and other colonies out of Europe; but he had to abandon Sicily to the duke of Savoy, and the Netherlands, Milan, and Sardinia to the house of Austria. Opposition at home was now quelled; and a treaty being signed with Portugal, Feb. 15, 1715, Philip was permitted to reign in peace for several years. The government had been heretofore mostly in the hands of the *camarera mayor*, the celebrated princess des Ursins, whom the queen had brought from France with her. This able woman had made and unmade ministers; she had assisted Orri in restoring the finances; she had even exercised her influence over the operations of war. The death of the queen, Feb. 14, 1714, seemed but to add to her power, and she so completely won the confidence of the king that it was rumored that she was to become his wife. By the advice however of Alberoni, she caused Philip to marry Elizabeth Farnese, whom she expected to govern as she had done her predecessor; but on her arrival Elizabeth unceremoniously banished the *camarera mayor* from Spain. Through her influence Alberoni was appointed prime minister (1716), and Spain seemed to be inspired with new life. Agriculture, commerce, and the arts revived; Sardinia and Sicily were reconquered, and Alberoni, rewarded with the dignity of cardinal, persuaded his master to undertake to restore the Stuarts in England by the assistance of Charles XII. of Sweden, to wrest the regency of France from the duke of Orleans, and to precipitate the Turks upon Austria. But, defeated in all these projects, Philip exiled the unsuccessful minister and joined the quadruple alliance, Feb. 17, 1720, giving up Sicily to Austria, while the duke of Savoy received Sardinia. He moreover, in 1721, abandoned Gibraltar and Port Mahon to the English, and by matrimonial alliances strengthened his union with France. His health had failed under his long trials; an invincible melancholy, aggravated by religious fears, preyed upon his mind; and, in spite of his wife's remonstrances, he abdicated, Jan. 10, 1724, in favor of his eldest son Louis, and retired to the monastery of San Ildefonso. But his son dying at the end of 8 months, he yielded to the entreaties of the queen and resumed the exercise of power, Sept. 6, 1724. Another change of policy now took place, and by the instigation of Ripperda, a Dutch adventurer, who had won the queen's favor, Philip entered into an alliance with the emperor Charles VI., by the treaty of Vienna, April 30, 1725, whereby the two sovereigns guaranteed each other's possessions, and the Spanish king promised to uphold the emperor's pragmatic sanction. The alliance proved far from advantageous. Philip made an unsuccessful attempt in 1727 to retake Gibraltar, and then becoming disgusted with Ripperda, whom he had made his prime minister, banished him from Spain, listened to proposals from Cardinal Fleury, sent plenipotentiaries to the congress at Soissons (1728), and finally signed with France and Great Britain the treaty of Seville, by which he obtained for Don Carlos, his elder son by Elizabeth, the reversion of the duchies of Tuscany Parma and Piacenza. He participated in the war for the succession of Poland (1733), and sent his son with the count of Montemar to Italy, where the latter, by his victory at Bitonto in 1735, conquered the kingdom of Naples, which was secured to the young prince by the treaty of Vienna (1738), while Tuscany was transferred to the duke of Lorraine, and Parma and Piacenza were assigned to the emperor. A dispute with England relating to American colonial affairs ended in hostilities, which were still going on when the war for the succession of Austria broke out. In this Philip, or rather his queen Elizabeth and her second son Philip, actively engaged; and the latter was in a fair way to win a kingdom in northern Italy when the king died. Notwithstanding his want of energy and enterprise, Philip's reign was upon the whole favorable to Spain; some useful reforms had taken place, especially in the administration of justice; the finances were managed with considerable regularity; the navy was restored to a state of efficiency; industry and commerce were fostered; and a royal library and academies of languages, history, and the fine arts were established. Philip had by his first wife two sons, viz.: Louis, who died after a reign of 8 months, and Ferdinand VI., his successor; by his 2d wife, Don Carlos, whom he left king of Naples, Philip, who became duke of Parma in 1748, and several daughters, 3 of whom married respectively Joseph, king of Portugal, Louis, dauphin of France, and Victor Amadeus III. of Savoy.

PHILIP I. and II. of Burgundy. See BURGUNDY.

PHILIP, one of the 12 apostles, born in Bethsaida, of which Peter and Andrew were also natives. Philip was the 4th of the apostles who attached themselves to the person of Jesus (John i. 43 *et seq.*), Andrew, John, and Peter having been called before him. The first act recorded of Philip is his bringing Nathanael to Jesus. When Christ fed the 5,000 people with five loaves and two fishes, he addressed to Philip the question: "Whence shall we buy bread that these may eat?" and it is added: "This he said to prove him, for he himself knew what he would do." (John vi. 1–7.) On another occasion Philip asked Jesus: "Lord, show us the Father, and it sufficeth us." (John xiv. 8.) From these two passages several of the fathers, as Chrysostom and Theodore of Mopsuestia, inferred that this apostle was weak in faith. In another place of the Gospel of John (xii. 20–22), we find that certain "Greeks" (proselytes of the gate) at Jerusalem, who wished to see Jesus, applied for that purpose to Philip, who, uncertain whether to comply with their wish or not, consulted Andrew, and both then went to tell Jesus. He is again mentioned in Acts i. 13, as being present with the other apostles at the religious assembly following the resurrection of Christ. According to Theodore he preached the gospel in Phrygia, according to others in Upper Asia, according to most in Scythia. All traditions agree that he met his death at Hierapolis in Syria. The Greek church commemorates him on Nov. 14, the Roman Catholic on May 1. A church at Rome claims to possess his body. Several apocryphal writings were ascribed to Philip; thus the Gnostics and Manichæans had an *Evangelium Philippi*, and the decree of Pope Gelasius denounces the forged "Acts of Philip."

PHILIP, King, sachem of Pokanoket, youngest son of Massasoit, and the successor in 1657 of his brother Alexander, killed Aug. 12, 1676. In 1662 he promised at Plymouth to continue the friendship heretofore existing with the English, to remain faithful to the king and colony, and not to dispose of any of his territory without giving them notice. In 1670–'71 rumors began to prevail that he was inclined to break the treaty. The tribe was frequently assembled, war preparations were constantly going on, and wanton murders were sometimes committed. The messengers from Massachusetts sent to mediate between the people of Plymouth and Philip held a meeting at Taunton, in which the latter renewed his covenant with his "ancient friends." But disregarding the condition, a new agreement was finally entered into, by which Philip admitted the superiority of the Plymouth government. For 3 years after this there was no disturbance, and it has been a doubtful point whether the storm which broke out so suddenly in 1675 was simply accidental in its origin, or the result of a real and deliberate plot. At any rate hostilities were precipitated by the rashness of some of the younger members of the tribe. Sassamon, a converted Indian who had informed the colony of the preparations going on, was killed. His murderers were tried, convicted, and executed, and in revenge the Indians murdered 8 or 9 white men. Philip thus became a rebel, although he is said to have wept when he heard that a white man's blood had been shed. The war was of the most desolating character, the Indians never meeting the enemy in the open field, but rapidly passing from one exposed point to another, burning villages, cutting off by ambuscades detached parties of troops, and shooting down every one who ventured to stray outside of the places of protection. Philip also formed an alliance with the powerful tribe of Narragansets, and in Dec. 1675, 1,000 men under the command of Josiah Winslow invaded their territory, stormed a fort in which there were said to have been 4,000 Indians, and utterly destroyed their village with all its stores. The war raged during the first half of 1676 with unabated fury, but the conquest of the Narragansets and the complete destruction of his own tribe soon left Philip without resources. Deserted by all, he was hunted from spot to spot, and at last, taking refuge at Mount Hope, was there attacked by a party under Capt. Church, and in attempting to flee was killed by an Indian. In this war 13 towns were completely destroyed and many others suffered severely; 600 buildings were burned, 600 of the colonists were slain, and the expenses were in the neighborhood of $500,000. The calamities of the war fell chiefly upon the Massachusetts and Plymouth colonies, Connecticut suffering comparatively little.

PHILIP, Pseudo. See Andriscus.

PHILIPPI, an ancient city in the E. extremity of Macedonia, enlarged by Philip, father of Alexander the Great, from whom it received its name. Previously it had been called Crenides, the "place of fountains," from the numerous streams in the neighborhood. Near it were gold mines, which were not very productive until worked by Philip, who obtained from them 1,000 talents a year. In 360 B. C. the city was in the hands of the Thracians, but was taken and fortified by the Macedonian monarch as a protection against the Thracian mountaineers. It was at Philippi that the battle between Brutus and Cassius on one side, and Antony and Octavius on the other, was fought in 42 B. C. There were two engagements on the same ground, 20 days apart, in the first of which Brutus gained the advantage over Octavius, and Antony over Cassius; but in the second the murderers of Cæsar were totally routed. Philippi was afterward made a Roman colony by Augustus. It was twice visited by Paul (Acts xvi. and xx.), and to the church founded there he addressed one of his epistles during his captivity at Rome. Subsequently Philippi became the ecclesiastical capital of Macedonia Prima, when that province was divided into two by Theodosius the Younger. It is now a mass of ruins, of which the chief are the remains of what appears to have been a palace, and of the acropolis, situated on a solitary height, and consisting of 3 towers and portions of walls.

PHILIPPIANS, Epistle to the, a canonical book of the New Testament, written, according to the unanimous testimony of the ancient church, by the apostle Paul. It is expressly referred to by Polycarp, by the churches of Vienne and Lyons in the 2d century, and by many of the earliest fathers. In modern times its authenticity has been doubted by Baur (*Paulus der Apostel Jesu Christi*, p. 458 *et seq.*), against whom it has been in particular defended by Lünemann (*Pauli ad Philippenses Epistolam contra Baurium defendit*, Göttingen, 1847). The epistle was probably written toward the close of the apostle's imprisonment at Rome. The occasion for it seems to have been given by a pecuniary contribution which the congregation at Philippi sent him through Epaphroditus (iv. 10-18). Epaphroditus was taken sick in Rome (ii. 27), and after his recovery was sent back with this epistle to the Philippians. The epistle may be divided into 3 parts. In the first (ch. i. and ii.) the apostle refers at length to his sufferings in Rome, which, however, fell out "rather unto the furtherance of the gospel." For this cause he declares himself willing to live and labor, though, as respected his personal feelings, he would "rather depart and be with Christ." He calls on the Philippians to maintain steadfastly their profession, and particularly urges union and humility. In the second part (ch. iii.) he warns them against the teachings of false Judaizing prophets, whom he calls dogs and evil workers. He shows that if Jewish descent and Jewish privileges were to go for any thing, no one could have stronger claims on this ground than himself; but he counts "all things but loss for the excellency of the knowledge of Jesus Christ," and he exhorts the Philippians to be likewise thus minded, and to strive after holiness. In the third part (ch. iv.) he addresses some exhortations to individual members, continues his general admonitions, refers again to his personal circumstances and to the aid received from the Philippians, and concludes with salutations and benedictions.—Good separate commentaries on this epistle have been written by Rheinwald (Berlin, 1827), Mathies (Greifswalde, 1835), Hölemann (Leipsic, 1839), Hengel (Amsterdam, 1839), Rilliet (Geneva, 1841), and in English by Pierce and Ferguson.

PHILIPPINE ISLANDS, a group of the Indian or Eastern archipelago, belonging chiefly to Spain, bounded N. and E. by the Pacific, S. by the seas of Celebes and Sooloo, and W. by the China sea; extending from lat. 5° 32′ to 19° 38′ N., and from long. 117° 21′ to 126° 8′ E.; area of the whole, about 200,000 sq. m.; pop. estimated at 5,000,000. The total number of islands is about 1,200, but the greater part are of little importance, being mere rocks. About 40 are of considerable size, and of these the principal are Luzon, Mindanao, Mindoro, Panay, Negros, Zebu, Bohol, Leyte, Samar, Masbate, and Palawan. Luzon is of very irregular shape, and consists of two portions connected by a narrow isthmus; its extreme length is 550 m., breadth 130 m.; area, 57,505 sq. m.; pop. 2,176,930. Mindanao is next in size to Luzon, and in shape somewhat resembles an isosceles triangle, measuring nearly 300 m. each way. Mindoro is about 110 m. long and 53 m. broad; Panay nearly 100 m. each way; Negros 130 m. long, with an average breadth of 25 m.; Zebu forms a narrow belt about 100 m. in length; Bohol is about 52 by 24 m.; Leyte 110 by 60; Samar 147 m. long with an average breadth of 50 m.; Masbate about 60 by 17 m.; and Palawan about 260 m. long with an average breadth of 40 m. In general characteristics all these islands bear a striking similitude. The coasts are much indented by arms of the sea stretching far into the land. A range of mountains traverses the entire group in a N. and S. direction, the summits of which seldom exceed 6,000 feet in height; many of them are extinct volcanoes, while some are still subject to dangerous eruptions. Among the mountains are many extensive valleys and plains, numerous marshes and bogs, and several lakes. Some of the rivers are of considerable size, and in conjunction with the arms of the sea that extend inland afford great facilities for internal communication. The geological formation consists of almost every kind of rock, but the structure is throughout volcanic. Gold is found in most of the larger islands, together with iron, copper, and lead, and mercury in Luzon. Sulphur is abundant, and coal has been worked to some extent on a small island off the E. coast of Luzon, and found in two places at the S. end of Mindanao. Carbonate of lime is very abundant, and marble is found in several places.—The climate is warm, and there is the same succession of seasons throughout the group as elsewhere in the Indian archipelago and upon the coasts of Hindostan. During the S. W. monsoon, from May to September, heavy rains fall upon the W. coasts, the low grounds become flooded, and violent storms are liable to happen, while the chain of mountains that traverse the group keep the weather on the E. shores serene and dry. The opposite monsoon, however, which begins to blow in October, brings similar weather on the E. coasts, keeps the climate constantly damp, and renders vegetation exceedingly luxuriant. The soil is remarkably fertile, and the principal productions of the group are rice, maize, cotton, sugar cane, coffee, cloves, pepper, indigo, hemp, tobacco, cacao, bananas, cocoanuts, and various other kinds of palms. Many tropical fruits and vegetables are grown, and the Spaniards have introduced several kinds from the temperate zones which have succeeded remarkably well. The mountains are covered with forests of large trees, which furnish excellent timber for various purposes, and several valuable gums and dye woods are procured. The buffalo is found wild as well as domesticated, and is used for ploughing and as a beast of burden. Antelopes, goats, pigs, foxes, monkeys, and wild cats are also found. The Spaniards introduced horses and horned cattle, many of which now run wild among the mountains. Sheep and all the domestic fowls were also introduced by them, and have thriven. The crocodile is found in the rivers and lakes; there are several species of tortoise, numerous serpents, some of which are poisonous, and a python said to attain the enormous length of 50 feet. Many kinds of water fowl are found on the lakes, and wild birds in the forests. A species of heron measuring 5 or 6 feet in height, and another from 2 to 3 feet high, are the most remarkable, the latter being often tamed by the natives and taught to dance to the sound of a flute or drum. The most numerous of the feathered tribes are those of the parrot and pigeon families; and there are jungle fowl and a species of pheasant. A bird called the *tubon* leaves its eggs in the sands of the sea shore to be hatched by the sun. The swallows which build the esculent nest so much prized by the Chinese frequent the limestone caves in great numbers. Fish are particularly abundant, and are said to be more so than in any other country; some of them are migratory, entering particular rivers from the sea for the purpose of spawning, at which times great quantities are caught with little trouble by the natives; 18 species found in Europe and the West Indies, and 41 peculiar to these seas, have been enumerated. A kind of sea slug, called *bêche de mer*, or by the Malays *tripang*, a Chinese delicacy, is found on the shores, together with a great variety of shell fish, including the pearl oyster, and the enormous *kima* cockle, some of the shells of which will hold a gallon and are used in the churches as fonts for holy water. Flights of locusts are sometimes experienced, but they are not very destructive. Mosquitoes and ants, including the termites or white ant, are numerous and troublesome on all the islands; but the common fly is not frequent, and fleas and bugs are almost unknown.—The group is inhabited by two distinct races of men, the Malayan and the negrito or oriental negro. The Malays form by far the most numerous part of the population, and are chiefly divided into two tribes, the Tagals and Bisayans. The negritos are found only among the mountains on the 3 principal islands, and are supposed to be the aborigines who have been driven from the more accessible parts by Malay invaders from the adjacent countries. Beside these races, the islands contain a considerable number of Chinese, who have recently settled there, and a comparatively small number of Spaniards and mixed breeds. The houses of the natives are formed of bamboos, raised on posts 8 or 10 feet above the ground, and covered with palm leaves.—The manufactures are not important, and consist chiefly of coarse cloth, straw hats, cordage, and cheroots. For the last named manufacture the islands are particularly famous, but it is a government monopoly, and at Manila employs a large number of hands. (See Manila.) Ship building is carried on to a small extent. The commerce of the Philippines is principally in the hands of foreigners. The value of imports and exports is estimated at $30,000,000 per annum, of which about half belongs to the British. During the year ending June 30, 1858, 51 vessels under the flag of the United States arrived at the Philippines, with cargoes valued at $463,659, and their return cargoes were valued at $2,299,744.—The civil, military, and naval administration of the Philippines and the Ladrone islands is in the hands of a governor general appointed by the crown of Spain, who resides at Manila. The islands are divided into provinces, each under a governor also appointed by the crown. In the parts not subject to the Spaniards, the laws are chiefly formed on the Koran, while among many tribes in the interior pagan customs and superstitions are the only guide. The people who have been fully subjected to Spanish rule have adopted the Roman Catholic religion, while some of the others profess the faith of Mohammed, and the remainder have a belief peculiar to themselves, which does not admit of any future state of reward or punishment. The native languages are barbarous; but the inhabitants of Malay descent are educated.—Many years before the nations of the West found their way into the eastern seas by the routes round the capes, the Arabs had established communication with the Indian archipelago along the W. shore of Hindostan and across the bay of Bengal. Some of their colonies were found in the Philippines when discovered by Magalhaens in 1521. The Spaniards sent a fleet from Mexico in 1565, which took possession of the group and named it in honor of Philip II. of Spain. Zebu was the first island attacked; and a few years afterward a descent was made upon Luzon, and a settlement effected at the mouth of the Manila river. The invaders proceeded to extend their conquests, but in consequence of the great extent of the islands and the warlike spirit displayed by the inhabitants their progress was slow, and even yet they are not masters of the entire group and all the smaller islands in its vicinity. In 1590 the sultan of Sooloo repulsed the Spaniards with heavy loss, and, in defiance of all attempts to conquer them, the inhabitants of that island continued for 3 centuries to maintain piratical fleets in the adjoining seas and to infest the coasts of the Philippines. Manila was attacked by a fleet of Chinese pirates in 1574. In 1639 about 30,000 natives of China had emigrated to Manila, but the Spaniards entertained such a hatred of the race that they slaughtered the greater part of them; and the Chinese, unless converted to Christianity, were not permitted to establish themselves on the islands till very recently. The English besieged Manila in 1762, and the place capitulated, paying $5,000,000 to redeem it from being plundered; but it was restored to the Spaniards when peace was concluded, after an occupation of nearly 2 years. In 1809 the authorities of the Philippines adhered to Ferdinand VII., and opened their ports to the British, since which time other nations have been admitted to the same privileges. The creoles and mixed breeds made an attempt to procure a liberal government in 1820, but the insurrection was suppressed by the Spaniards arming the converted natives. Several earthquakes have occurred since the islands have been known to Europeans, the most recent being in July, 1852.

PHILIPS, an E. co. of Ark., separated from Miss. by the Mississippi river, bounded N. E. by the St. Francis and L'Anguille rivers, and drained by Big creek and other smaller streams; area, 725 sq. m.; pop. in 1860, 14,876, of whom 8,941 were slaves. It has a level surface, swampy in parts, and a fertile soil. The productions in 1854 were 399,010 bushels of Indian corn, 6,473 of oats, and 11,300 bales of cotton. In 1850 there were 5 saw mills, 3 newspaper offices, 4 churches, and 95 pupils attending public schools. Capital, Helena.

PHILIPS, Ambrose, an English poet, born in 1675, died in London, June 18, 1749. He was graduated at Cambridge in 1696, and was one of the authors of the collection of verses published by the university on the death of Queen Mary. Among his earliest poetical compositions are six "Pastorals," which were printed in Tonson's "Poetical Miscellany" in 1709, the pastorals of Pope appearing in the same volume. The rivalry thus provoked led to a violent warfare between the two authors and their respective adherents, and Philips, whose verses are now forgotten, was esteemed by not a few the first of English rustic poets. Pope mercilessly ridiculed Philips's pastorals in a serio-comic paper in the "Guardian." In 1712 Philips produced a tragedy called "The Distressed Mother," founded upon Racine's *Andromaque*. It was played with great success, and received high praise from the "Spectator." In 1722 he brought out two other tragedies, "The Briton," and "Humphrey, Duke of Gloucester;" and soon afterward, in connection with Dr. Boulter, he commenced a serial paper under the title of "The Freethinker," which enjoyed great popularity. When Boulter was made primate of Ireland, Philips became his secretary, and was chosen representative of the county of Armagh in the Irish parliament. In Dec. 1726, he was made secretary to the Irish chancellor, and in Aug. 1733, judge of the prerogative court. Some years after the death of his patron he returned to London (1748), and published a collection of his poems, of which, according to Dr. Johnson, "at least half deserves to be read."

PHILIPS, John, an English poet, born in Bampton, Oxfordshire, Dec. 30, 1676, died Feb. 15, 1708. He was educated at Winchester and at Christchurch, Oxford, where he acquired considerable reputation by his poetical abilities and esteem by his personal virtues. In 1703 he published a burlesque poem entitled "The Splendid Shilling," which was so well liked that in 1705 he was urged to compose a gratulatory poem on the battle of Blenheim. His "Cider," in two books (1706), is an imitation of Virgil's Georgics. His verses are generally well constructed and pleasing, but he closely copied Milton, without possessing the genius which makes imitation pardonable. It has been noticed that in every one of his poems except "Blenheim" he takes occasion to praise tobacco.

PHILISTINES (Heb. *Pelishtein*), a tribe which gave to the Holy Land the name of Palestine, though possessing only the portion on the S. coast bounded by the hilly countries of Ephraim and Judah and extending S. W. to the confines of Egypt. Their origin is unknown, although many modern scholars suppose that they came originally from Crete. They were early settled in Palestine, and from fear of war Moses did not lead the Israelites through their country, which was the most direct route. From the time the Jews passed over into the Holy Land, they were engaged in a perpetual conflict with this warlike tribe, especially during the time of the later judges. Saul, the first Jewish king, fell in a battle against them. David defeated them in several battles, and to some of his successors they paid tribute; but generally they were independent and carried on war against the Hebrew monarchs. Their situation between the contending powers of Assyria and Egypt rendered their land a thoroughfare for the passage of hostile armies. In the time of the Maccabees Philistia was subject to Syria, and subsequently came under the power of the Romans. Its chief cities were Gaza, Ashdod or Azotus, Ascalon, Gath, and Ekron, which early became rich and powerful in consequence of a large transit and maritime trade, which was still further promoted by superior agricultural resources. The religion of the Philistines resembled that of the Phœnicians, the deity most worshipped being Ashtoreth, who was reverenced as Dagon or Decirto at Ascalon, Gaza, and Ashdod. Ekron was the principal seat of Beelzebub, and to the oracle there Ahaziah, king of Samaria, sent when he became sick. They had numerous priests and soothsayers, and in war carried about with them the images of their gods. Of the worship of Dagon a relic still exists in some parts of Syria in the care taken of certain holy fishes.

PHILLIPS, Charles, an Irish barrister, born in Sligo in 1789, died in London, Feb. 1, 1859. He was educated at Trinity college, Dublin, was called to the Irish bar in 1812, and in 1821 to the English bar, at which time he had acquired a considerable reputation as an effective though florid speaker. Some of his occasional addresses on miscellaneous topics were formerly popular, but his oratorical prestige was acquired principally by his professional efforts at the criminal bar. For some years he was regarded as the leading counsel at the Old Bailey. After the alteration of the bankruptcy laws he was appointed by Lord Brougham, then lord chancellor, to the district court of bankruptcy at Liverpool, whence in 1835 he was transferred to the insolvent debtors' court in London as one of the commissioners, a position which he occupied during the remainder of his life. As an author he is best known by his "Recollections of Curran and some of his Contemporaries" (2 vols. 8vo., 1818), of which a 5th edition appeared in 1857, and by a volume of speeches published in 1817, one of which, in the crim. con. case of Guthrie *vs.* Sterne, went through several editions. In the early part of his career he published some pieces of verse, and at various periods of his life pamphlets and historical sketches. His latest efforts in the last named department were "An Historical Sketch of Arthur, Duke of Wellington" (1852), "Napoleon III." (1854), and "Vacation Thoughts upon Capital Punishments" (1856).

PHILLIPS, Georg, a German historian, born in Königsberg in 1804. His parents were English. He was educated at Munich and Berlin, and subsequently went to England, where he passed some months in the study of the Anglo-Saxon laws. Upon his return he renounced Protestantism, and became an ardent defender of the Roman Catholic church, maintaining that it was the basis of all the institutions of Germany, and had of right an absolute supremacy in all things over the civil power. In 1833 he was named professor of civil law at Munich, and afterward royal counsellor at Landshut; but he never performed the duties of the latter office. In 1849 he accepted the professorship of canon law and of legal history at Innsbruck, which he exchanged two years later for that of legal history at the university of Vienna, which position he now holds. He has published works on Anglo-Saxon, English, and German laws, his most important work being *Kirchenrecht* (4 vols., Ratisbon, 1845–'51).

PHILLIPS. I. John, LL.D., an American merchant and scholar, born in Andover, Mass., Dec. 27, 1719, died in Exeter, N. H., April 21, 1795. He was graduated at Harvard college, studied theology, and preached for a time, but subsequently engaged in mercantile affairs. The wealth thus acquired was devoted in large measure to the promotion of education. He endowed a professorship in Dartmouth college, and contributed liberally also to Princeton college. He gave to Phillips academy at Andover $31,000, beside a third interest in his estate; and founded Phillips academy at Exeter in 1781, endowing it at first with $60,000, and subsequently making other donations, and a bequest to it, amounting in all to $84,000 more. II. Samuel, jr., nephew of the preceding, born in North Andover, Mass., in 1751, died in Andover in 1802. He was graduated at Harvard college in 1771, was a member of the provincial congress for 4 years beginning with 1775, a member of the constitutional convention of 1779, a state senator for 20 years following the adoption of the constitution, and for 15 years president of the senate, a judge of the court of common pleas from 1781 to 1798, commissioner of the state in Shays's insurrection, and lieutenant governor at the time of his death. He was also largely engaged in farming, manufacturing, and mercantile pursuits. He planned, founded and organized Phillips academy at Andover, the first incorporated academy in Massachusetts, and one of the earliest in the country. The theological seminary at Andover, which grew out of this academy, was a development of his plan. He gave the academy some lands, and procured endowments for it from his father, uncles, and cousin, to the amount of $63,000. At his death he left to the town of Andover a fund of $5,000, the income to be used for the purpose of aiding the professional acquirements of female teachers in the town, of extending the annual terms of instruction of its common schools, and for the purchase and gratuitous distribution of certain specified books to "poor and pious Christians."

PHILLIPS, John, an English geologist, born Dec. 25, 1800. He is the nephew of William Smith, the "father of English geology," and in 1815 became the pupil and assistant of his uncle, and accompanied him in the surveys made for the preparation of a series of geological sections and county maps. About 1827 he was appointed keeper of the museum of the Yorkshire philosophical society, and delivered courses of lectures in various parts of England on geology, general physics, chemistry, mineralogy, and natural history. After having successively occupied the chair of geology in King's college, London, and in the university of Dublin (1844), he was appointed in 1856, on the death of Dr. Buckland, professor of geology in the university of Oxford. As assistant general secretary of the British association since 1832, he has arranged and edited the numerous volumes of reports, including the proceedings, recommendations, and transactions of the association. In 1858 and 1859 he was elected president of the geological society. He has written various works on geology.

PHILLIPS. I. Richard, an English chemist, born in 1778, died in London in 1851. He was a pupil of Dr. George Fordyce, and one of the founders of the Askesian society for the discussion of philosophical subjects, established in 1796. He was successively lecturer on chemistry in various public schools, and in 1839 was appointed curator and chemist of the museum of economic geology, now the museum of practical geology, which office he held till his death. In 1821 he became the conductor of the "Annals of Philosophy," and upon the incorporation of that journal with the "Philosophical Magazine" he was retained as one of the editors. In 1822 he was elected a fellow of the royal society, and during 1849 and 1850 was president of the chemical society of London. He discovered the presence of phosphoric acid in uranite, a fact which had escaped the attention of Berzelius. II. William, an English geologist, elder brother of the preceding, born in London, May 10, 1775, died at Tottenham Green in 1828. He was one of the founders of the Askesian society, and in 1801 contributed to its proceedings a communication on the divining rod. He was an early member of the geological society, and in 1827 was elected fellow of the royal society. Mineralogy and crystallography are especially indebted to him for a large number of exact measurements of crystals by the reflecting goniometer of Wollaston. Beside contributing a number of papers to the "Transactions of the Geological Society," he wrote communications for scientific periodicals, and published works on mineralogy and geology, which had great influence in popularizing those branches of science.

PHILLIPS, Wendell, an American abolitionist, born in Boston, Mass., Nov. 29, 1811. He is a son of John Phillips, first mayor of Boston, was graduated at Harvard college in 1831, and at the Cambridge law school in 1833, and was admitted to the Suffolk bar in the following year. It was at this time that the excitement resulting from the agitation of the slavery question had spread throughout the country, rising to an unparalleled degree of intensity, and culminating in 1835 in numerous outbreaks of mob violence. A witness of the Boston mob of 1835 (see GARRISON, WILLIAM LLOYD), Mr. Phillips joined the abolitionists in 1836, relinquishing his professional practice in 1839, from unwillingness to act under his attorney's oath to the constitution of the United States. He made his first speech worthy of mention in Dec. 1837, on the occasion of a meeting of citizens in Faneuil hall, "to notice in a suitable manner the recent murder, in the city of Alton, of the Rev. Elijah P. Lovejoy, a native of New England, and citizen of the free state of Illinois, who fell in defence of the freedom of the press." At a moment when the purpose of the meeting seemed likely to be defeated, and its resolutions rejected, by the opposition of Attorney-General Austin, Mr. Phillips, who was among the audience, in an outburst of indignant eloquence, at once rebuked the attorney-general for the sentiments he had uttered, and secured the passage of the resolutions. Since that time he has been a prominent advocate of the doctrines of the Garrisonian school of abolitionists, who, believing the constitution of the United States to be an immoral compact between freedom and slavery, and the Union resulting therefrom the main prop of the slave system in America, refuse to swear to support the former, and consequently abstain from voting, and labor for the dissolution of the latter, as the best, if not the only, means of effecting emancipation. Mr. Phillips is also identified with the progress of the temperance and woman's rights movements, and with efforts for the amelioration of the criminal law. He is a frequent public lecturer on miscellaneous subjects. As an orator, Mr. Phillips is ranked among the very foremost that America has produced. His lectures and speeches have never been collected, but may be found in the pages of the Boston "Liberator" and the New York "Anti-Slavery Standard."

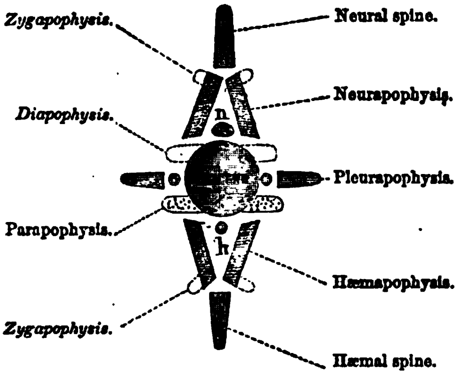
PHILO JUDÆUS, a Jewish philosopher of Alexandria. The place and time of his birth are uncertain, but from indications in some of his writings it may be inferred that he was born in Egypt a few years before Christ. He was of the priestly tribe, and was honored with important political trusts, among others with the charge of the embassy sent to Caligula, after the massacre of the Jews in Egypt, to defend that people against the calumnies of Apion. It is stated by Eusebius that, on a second embassy to the emperor Claudius, Philo became acquainted with the apostle Peter at Rome. With the exception of a visit to Jerusalem to which he alludes, nothing more is known of his history, except that he lived and taught at Alexandria, enjoying great personal popularity, and exercising by his writings a wide influence upon the opinions of his Jewish brethren. By the marriage of his son to a daughter of King Agrippa he was allied to the royal house of Judæa. He appears to have lived to old age, although no account is given of his death. Philo belonged probably to the sect of the Pharisees, but departed widely from the methods of that sect in his system of interpretation. While he held firmly to the law of Moses and to all the Jewish traditions, he was a Platonist in his ideas, and endeavored to reconcile the philosophy of the Grecian sage with the records of the Hebrew lawgiver. The method which he adopted of allegorizing the sacred history had already been tried in the schools of Alexandria, but was carried so far by Philo that it became in some sense a new science. His general purpose was to show that the Mosaic revelation contained in germ all that was afterward developed into the various forms of Greek philosophy. He finds the principal doctrines of the stoics and the Eleatics, not less than of the Platonists, in the Scriptures of the chosen people of God; and in his characteristic doctrine of the Logos and of the ideal and archetypal world, he anticipates the speculations of the Gnostics. The writings of Philo, which are numerous, are mostly on subjects connected with the narrative of the book of Genesis or the Levitical law, or suggested by some incident in that record. Some of his treatises are polemic and apologetic. They are of great importance, not only as showing the state of opinion among the Jews in that age, but also as illustrating the Christian and apostolic history in their allusions. The best edition of the works of Philo is that of Thomas Mangey (2 vols., London, 1742), but additional treatises were discovered by Cardinal Mai (1818), and others exist in Armenian versions (Venice, 1822). The only English translation of them is that by Mr. C. D. Yonge, in Bohn's "Ecclesiastical Library" (4 vols. 12mo.).

PHILOLOGY. See LANGUAGE.

PHILOPŒMEN, the last great general of the Greeks, born about 252, died by poison in Messene in 183 B. C. His father, Craugis, was one of the most prominent men of Megalopolis, and belonged to a noble family of Arcadia; but dying early he left his son to be brought up by his friend Cleander. The studies of Philopœmen were chiefly literature, philosophy, and war, the last of which he considered, according to Plutarch, "the most important and useful occupation of men, and despised those who were not versed in it." As soon as he became old enough to enter the military service, he eagerly participated in the incursions which were at that time often made into Laconia. He first appears prominently in 222, when Cleomenes III. of Sparta having seized upon Megalopolis by night, Philopœmen with a few others made a most determined resistance. The following year Antigonus Doson, king of Macedon, coming into the Peloponnesus to the assistance of the Achæan league, Philopœmen joined his army with 1,000 foot and a detachment of cavalry, and contributed mainly to the victory of Sellasia, where he refused to leave the field, though wounded in both thighs by a javelin. In this battle his generalship and courage had been so conspicuous, that Antigonus offered him a command in his army; but Philopœmen, who hoped to secure the unity and independence of Greece by means of the Achæan league, declined. As peace prevailed at home, however, he went to Crete and assisted the city of Lyttus in its war against Cnossus. Aratus, the founder of the Achæan league, having died in 213, Philopœmen on his return in 210 was made commander of the cavalry. Aratus had gained his successes by means of Macedonian mercenaries; but Philopœmen infused a love of military glory into the Achæan youth, and trained them to the use of arms. In 209 he accompanied Philip, the successor of Antigonus Doson, in the expedition against Elis, and in a battle near the river Larissus defeated the Ætolians and Eleans, and slew their leader, Damophantus, with his own hand. A war broke out between the Achæans and Machanidas, tyrant of Sparta, and in a battle fought at Mantinea Philopœmen totally routed the enemy, himself killing the Spartan king. He was hailed as liberator of Greece, and so seriously did his plans conflict with those of Philip of Macedon, that an unsuccessful effort was made by that prince to have him assassinated. In 202 Nabis, who had succeeded Machanidas in the government of Sparta, seized upon Messene, and Philopœmen, being unable to persuade Lysippus, then general of the league, to take the field, collected a body of armed men himself and drove the tyrant back into Laconia, and the following year, having been elected strategus, defeated his army at Scotitas with much slaughter. Being succeeded in the office by a partisan of Philip, he went to Crete a second time and took command of the forces of the city of Gortyna. Returning in 194, he found that Nabis had renewed his hostilities against Megalopolis, but that both he and Philip had been defeated by the Romans under Flamininus, who had formed an alliance with the Achæans. No sooner, however, had Flamininus left Greece than Nabis began the war again, invaded Achaia, and besieged Gythium. To relieve this town Philopœmen fitted out a fleet, which however failed to accomplish its purpose; but marching against Sparta, although he fell into an ambush, he defeated the enemy with terrible slaughter. Shortly after his return Nabis was murdered by his Ætolian auxiliaries, whereupon Philopœmen hastened to Sparta and induced that city to join the Achæan league. In 189, however, the party hostile to him gained the supreme power there, and the connection with the league was dissolved, 30 of Philopœmen's friends being put to death. Both sides appealed to Rome. An ambiguous answer was returned by the senate, which the Achæans interpreted in their own favor, and in 188 Philopœmen, as strategus, marched into Laconia. Sparta submitted, and was treated with great rigor. The walls of the city were razed, the exiles were all restored, all inhabitants brought in or enfranchised by Nabis were required to depart on a fixed day, the laws and institutions of Lycurgus, which had subsisted, either well or ill observed, for 7 centuries, were abolished, and the citizens were obliged to adopt those of Achaia. Of the disfranchised, 3,000 refusing to leave the country were sold as slaves. These severe measures offered an opportunity to the Romans of again interfering, who compelled the granting of a general amnesty and the restoration of the political exiles. In 183 Philopœmen was elected strategus for the 8th and last time. Messene now dissolved its connection with the league, whereupon the Roman ambassador, Flamininus, wrote to Philopœmen, desiring him to call together a meeting of the Achæans to discuss the affairs of that city. This he declined to do, and collecting a detachment of cavalry hastened forward to reduce Messene, but being repulsed was thrown from his horse and fell into the hands of the enemy. At night an executioner was sent to him with a cup of poison, and hearing that the troop he had led had retired in safety, he said: "Then we are not altogether unhappy," and drained the cup. The news of his death excited great indignation in Achaia, and Lycortas at the head of an army immediately entered Messenia and ravaged the country far and wide. Dinocrates the Messenian leader slew himself, and his accomplices in poisoning Philopœmen were stoned to death. The body of Philopœmen was burned, and the ashes put in an urn were carried to Megalopolis by the historian Polybius, in a solemn procession of the army, and statues to his memory were erected in almost all the cities of the league.

PHILOSOPHICAL ANATOMY, a department of anatomical science, based on data furnished by descriptive and comparative anatomy, embryology, and histology, to which are applied the philosophical principles employed in mental and moral science. It is also well called transcendental anatomy, as it seeks a fundamental unity in all the forms of nature, and, in the usual restricted signification of the term, aims to establish a primary plan or archetype of which all skeletons, at least of the vertebrata, are modifications. A brief sketch of the various systems from Oken to Owen cannot fail to render more intelligible the true character of the human skeleton, external and internal, by presenting the primitive type of which they are the extremely modified forms. Referring the reader to the concluding part of the article on Comparative Anatomy for the main features of its origin and progress, it will be sufficient here to say on these points that it was studied carefully by Oken and Carus in Germany, by Geoffroy St. Hilaire in France, and by Owen in England. Presuming that the reader has a knowledge of anatomical terms, without which all these systems will be unintelligible, we may at once introduce that of Lorenz Oken, who indisputably stands at the head of philosophical anatomists. As early as 1807 he made 3 cranial vertebræ, which he calls those of the ear, jaw, and eye, proceeding from behind forward; the auditory nerves traverse the 1st, the trifacial the 2d, and the optic the anterior or 3d; the petrous bone he considers a sense capsule of the ear; he recognizes the vomer as a 4th rudimentary vertebral body, with the lachrymal bones as laminæ or *neurapophyses*, and the nasals as spinous processes or neural spines; the palate bones he regards as the ribs of the head anchylosed; the squamous portion of the temporal bone of mammals and the tympanic of birds represent the scapula and ilium of the head; he recognized the arm, forearm, and hand in different parts of the upper jaw, and the corresponding bones of the posterior limbs in the lower jaw; the clavicles of the head were the pterygoid bones. In fact, the head was to him a repetition of the whole trunk with all its systems; he even goes so far as to state as a fundamental principle that the whole osseous system is only a repetition of a vertebra. This system was at first scoffed at, but the striking character of some of his homologies opened the eyes of his countrymen to the new light; after various modifications suggested by other observers or the results of his own researches, in 1843, in his "Physiophilosophy" (Ray society translation, London, 1847), he pursues his cranial homologies still further, always regarding the head as a repetition of the trunk, a doctrine strenuously combated by Owen. The present article will not permit any extended exposition of his theory, which is detailed at length in the work just quoted, pp. 318–422. His cranial vertebræ are: 1. The occipital, consisting of the body, 2 condyles, and crest of this bone; this is also the auditory vertebra, as it encloses the auditory bones, and cerebellum which gives off the nerves of hearing. 2. The parietal, consisting of the body of the posterior sphenoid, the greater wings, and the parietal bones; this is also the lingual vertebra, the maxillary and lingual nerves passing through the wings. 3. The frontal, composed of the body of the anterior sphenoid, orbital or lesser wings, and 2 frontals; this is also the optic vertebra, the optic nerves passing through the orbital plates; it also surrounds the cerebrum. 4. The nasal, consisting of vomer, ethmoid, and 2 nasal bones, containing the olfactory nerves. The skull contains, therefore, a vertebra to each sense; the sense of touch is disseminated over the whole body, and its vertebræ are 35, 15 in the neck and chest, 5 in the abdomen, and 15 in the lumbar, sacral, and caudal regions. This system is normal only in the human type, animals being irregular men. He says the pectoral and abdominal muscles are ennobled in the muscles of the face; the mouth is the stomach in the head, the nose the lung, the tongue the end of the intestine converted into muscle, and the salivary glands the liver.—The poet Goethe first suggested to anatomists the idea of representing the mutual relations of the bones by figurative diagrams; he had conceived the idea of the cranial vertebræ as early as 1790, but did not make it public until after Oken's inaugural dissertation in 1807. In his essays on comparative anatomy (1819–'20) he made 6 vertebræ in the mammalian head, 3 on the posterior part enclosing the "cerebral treasure" and its delicate subdivisions, and 3 anterior communicating with the external world; these vertebræ are the occipital, posterior and anterior sphenoid, palatal, upper jaw, and intermaxillary. Duméril (*Magasin encyclopédique*, 1808) showed the analogy of the cranial segments and their muscles to the spinal vertebræ and muscles; he regarded the basi-occipital bone as a vertebral body, the condyles as oblique processes, the occipital protuberance as a spinous process, and the mastoid as a transverse process. He considered the body of the sphenoid as perhaps a 2d vertebral centre, but rather inclined to the opinion that the head consisted of a single huge vertebra, with similar form, use, and muscular attachments as a spinal vertebra. Spix (*Cephalogenesis*, 1815) adopted the number and composition of the cranial vertebræ of Oken's system, only giving them new names. De Blainville (1816) taught in his lectures that the head consists of a series of consolidated vertebræ, developed in proportion to the nervous system contained within them, with simple appendages (ribs), or compound (jaws, limbs, &c.); this is further developed in his *Ostéographie* (1839) and *Histoire des sciences de l'organisation* (1845). Bojanus (*Isis*, 1818) made 4 cranial vertebræ, the 4th being the nasal, whose neural arch he determined, and the ribs of the tympanic; he named the vertebræ acoustic, gustatory, optic, and olfactory.—Geoffroy St. Hilaire (*Annales du muséum d'histoire naturelle*, 1807, vols. ix. and x.) recognized the homology of the pectoral fins of fishes with the anterior extremities of birds, of the bony apparatus of a sternum and its annexes with these parts in higher vertebrates; he attempted the determination of the cranial bones in the crocodile, dividing them into those of the mouth, nose, eye, ear, and brain, regarding the skull as a kind of house with chambers for the lodgment and protection of the brain and organs of sense, but he did not at that time appear to have had the idea of cranial vertebræ; he showed that the cranium of birds was composed of the same bony pieces as that of man and mammals, recognizing a unity of plan of organic composition in all the vertebrata. His *Philosophie anatomique* (2 vols. 8vo., Paris, 1818–'22) developed his ideas on the homologies of the vertebrate skeleton; in the *Mémoires du muséum d'histoire naturelle* (vol. ix., 1822, pp. 76–119) he has given his ideas on the structure and typical form of the vertebra, and a representaview in fig. 5. In the *Annales des sciences naturelles* (vol. iii., 1824) he explains in a synoptic table (plate 9) the composition of the bony head of man and vertebrates; he makes 7 vertebræ as follows, from before backward: the labial, nasal, ocular, cerebral, quadrigeminal, auricular, and cerebellar. He studied the homologies of the hyoid arches more carefully than his predecessors; he made 9 pieces in each vertebra, combining, however, some of the parts of the external or dermal skeleton to which the vertebral theory does not apply; he regarded the branchial arches of fishes as the homologues of the tracheal rings of terrestrial vertebrates. With all his errors, Geoffroy St. Hilaire gave a great impetus to the study of philosophical anatomy in France. His most powerful and constant antagonist was Cuvier, who treated with ridicule and contempt this form of German philosophy; these two anatomists carried on their discussions, both by lectures and writings, with all the eagerness and often the bitterness of a partisan spirit; ability and brilliancy were on the side of Cuvier, but truth and the more philosophical treatment of the subject were with Geoffroy St. Hilaire. Thus opposed to each other, the science of philosophical anatomy, instead of making progress in France, at the death of these two colleagues had fallen into a very chaotic and unsatisfactory condition.—Carus of Dresden (1828) was the most successful cultivator of philosophical anatomy after Oken; in his *Grundzüge der vergleichenden Anatomie und Physiologie* (translated into French by Jourdan, Brussels, 1835) he gives fair credit, though slight mention, to French anatomists, and lays great stress upon the researches of Germans in this direction; he says incidentally that philosophic osteology owes nothing to the English and Italians, an assertion since contradicted by the appearance of the works of Richard Owen, who, if any one, may be said to represent the present opinion of the scientific world in matters of philosophical anatomy. Carus maintains that the same relation exists between the 3 cranial vertebræ and the 3 cerebral masses pertaining to the 3 great sensorial nerves (of hearing, vision, and smell), as between each spinal vertebra and the ganglionic swelling of the cord which it envelopes. He gave the name of dermatoskeleton to that which in solidifying separates an animal from the external elementary substance, air or water; this external elementary substance also penetrates within the animal, requiring a more or less solid limitation internally, in the alimentary and respiratory systems, constituting the splanchnoskeleton; the neuroskeleton is that which limits and protects the nervous system, being peculiar to the vertebrates, the most perfectly developed and in proportion to the nervous system. The dermatoskeleton is the first and lowest in the animal kingdom; it appears as horny envelope, shell, scales, osseous plates, and skin; it is increased from without, permanent or deciduous, and reproduced by the coagulation or calcification of the integument. The splanchnoskeleton is also inferior in rank, cartilaginous, but capable of undergoing bony transformation in the higher animals; tracheal rings, branchial arches, and teeth belong to this skeleton; the neuroskeleton is formed as indicated in the article BONE. He divides the cerebral mass into 3 portions, cerebellum, cerebrum, and optic lobes between them, with 3 pairs of ganglia in front; the spinal ganglia, in man, are 30. He constructs the skeleton on geometrical principles, starting from the hollow sphere, double cone, and cylinder; he makes what he calls proto-, deuto-, and trito-vertebræ; the 1st (ribs) enveloping the body and its viscera, in relation with vegetative life; the 2d (vertebræ) protecting the nervous system; and the 3d (limbs) becoming the osseous framework which sustains the muscular and locomotive organs. His 3 principal cranial vertebræ correspond to the 3 cerebral masses, and are the occipital, centricipital, and sincipital; the 3 facial vertebræ form the nose and its cartilages, and the 3 intervertebræ, he names auditive, optic, and olfactory. It has been found, however, that it is impossible to explain the vertebrate homologies by his diagram archetype; for this the reader is referred to the work above cited. In fishes we find the first development of the neuroskeleton, as distinguished from the splanchnic and external skeletons, but at its lowest stage, being cartilaginous or partially osseous; it is of inferior vitality, and the component parts are imperfect in form and number; in this class the sexual organs predominate. In reptiles the neuroskeleton is for the first time bony; the splanchnic skeleton is truly cartilaginous, and the external truly corneous; the abdominal region or the digestive system predominates. In birds the thoracic region or respiratory system predominates, extending even into the cavities of the bones and feathers. In mammals the cranium predominates and the nervous system; the neuroskeleton being the highest developed, with a corresponding inferiority of the external and splanchnic skeletons. Carus divided the vertebra into 6 portions, and the skeleton generally into this number or its multiples, while Oken adopted the number 5.—Meckel did not materially affect the progress of philosophical anatomy, but he confirmed many previous principles and homologies by his minute and accurate descriptions, his knowledge of individual formations, and his history of development.—Prof. Owen has given the greatest extension to the science of philosophical anatomy in various writings and lectures since 1838, among which may be mentioned his various "Hunterian Lectures," "Lectures on Comparative Anatomy" (invertebrates and fishes), "On the Archetype of the Skeleton," "On the Nature of Limbs," and "On the Principal Forms of the Skeleton and Teeth;" the last is the most popular, and has been reprinted from "Orr's Circle of Sciences" at

Philadelphia (12mo., 1854). As far as the skeleton is concerned, the aim of philosophical anatomy is to discover the original idea which presided at its construction, or the archetype to which all the modifications of the vertebrate series can be referred. The archetype refers principally to the neuroskeleton, which alone appears to have any typical pattern; beside the other skeletons already defined by Carus, and of which good examples (of the dermatoskeleton) may be found in the plates of the sturgeon, crocodile, and armadillo, and the carapace of the tortoise, he mentions a scleroskeleton, or bones developed in tendons, ligaments, and aponeuroses. In order to understand his terms, and to comprehend his archetype skeleton, it will be useful to study his typical vertebra, here given:



In the above figure the names printed in Roman letters are the autogenous elements, or those which are ordinarily developed from distinct and independent centres; the names in Italics indicate the processes which are continuations of some of the preceding elements; the latter are the *diapophyses* or superior transverse processes, and the *zygapophyses* or oblique articular processes of human anatomy. The autogenous elements enclose generally foramina which form canals in the vertebral chain; the most constant and extensive canal is that marked *n*, above the central body, for the lodgement of the spinal cord or neural axis, composed of the laminæ hence called *neurapophyses;* the second canal, marked *h*, below the centrum, is more irregular and interrupted, lodging the central vessel and the great trunks of the vascular system, and is formed by the lamellæ hence called *hæmapophyses.* On the sides of the centrum, most commonly in the region of the neck, is a canal circumscribed by the *pleurapophyses* or costal processes, the *parapophyses* or inferior transverse processes, and the *diapophyses* or superior transverse processes. Thus a perfect or typical vertebra, such as is found in the thorax of man and most of the higher vertebrates, and in the neck of many birds, with all its elements, presents 4 canals around a common centre; in the tail of most reptiles and mammals the hæmapophyses are joined to the lower part of the centrum, protecting only the artery and vein; but when the central organ of circulation is placed within it, the hæmal arch is largely developed, as in the thorax, where the pleurapophyses (ribs) are much elongated, and the hæmapophyses (costal cartilages) are removed from the centrum and placed on the end of the ribs, the bony circle being completed by the hæmal spine or sternum; the neural spine is the equivalent of the superior spinous process. He shows the fallacy of Cuvier's definition of a vertebra; the latter maintained that vertebræ have a special number of pieces arranged in a definite manner, looking more at their position in the series than at their composition; his prejudices against the vertebral theory led him into many untenable and contradictory statements and definitions. Cuvier divided the bones of the head into cranial and facial, making 8 annular segments of the former; the anterior comprised the frontal and ethmoid, the middle the parietals and sphenoid, and the posterior the occipital, the temporals being intercalated between the occipital, parietal, and sphenoid; he does not apply this to the lower vertebrates, in which it is most evident, nor to the face, or he would have found that these divisions do not include the same bones in all animals, the same being in one a cranial and in another a facial element; this again involved him in many inaccuracies and contradictions. Owen divides the endoskeleton of the human head into 4 segments, as follows, beginning behind: 1. Occipital or epencephalic vertebra, with the following composition: centrum (c.), the basi-occipital portion of the occipital bone; parapophyses (p.) and neurapophyses (n.), coalesced into the lateral or condyloid portions, the former marked by the ridge for the *rectus lateralis* muscle; neural spine (n. s.), the proper occipital bone; pleurapophyses (pl.), the scapulæ; diverging appendages (d. a.), the bones of the upper extremity; hæmapophyses (h.), the coracoid processes of the scapulæ; and hæmal spine (h. s.) deficient. The clavicle and first segment of the sternum, which complete the mammalian scapular arch, are the hæmapophyses and hæmal spine of the atlas or first cervical vertebra. 2. The parietal or mesencephalic, with c., the basisphenoid or posterior part of the body; p., mastoid processes; n., greater wings of sphenoid; n. s., parietal bones; pl., styloid processes; d. a., greater cornua of hyoid bone; h., lesser cornua; and h. s., body of hyoid. 8. Frontal or prosencephalic, with c., anterior body of sphenoid; p., external angular processes of frontal (post-frontals of fishes); n., lesser wings of sphenoid; n. s., frontal bone; pl., tympanic portion of temporal; d. a. deficient; h., articular portion of lower jaw; and h. s., dental portion of same. 4. Nasal or rhinencephalic, with c., vomer; n., *ossa plana* of ethmoid; n. s., nasal bones; pl., palate bones; d. a., pterygoid and malar bones, with *squamous* and zygomatic portions of temporal; h., superior maxillary bones; and h. s., intermaxillaries. The splanchnoskeleton of the head consists of the petrosal and ear bones, the turbinated bones, and the teeth; the external skeleton consists of the lachrymal bones. These 4 cranial vertebræ, according to the organs of sense, would be: 1, auditory, related to the organ of hearing; 2, gustatory, with the organ of taste, whose nerve (gustatory or trifacial) pierces the neural arches of this segment or passes between it and the frontal; 3, optic, with the organ of vision between this and the nasal segment; and 4, olfactory, with the organ of smell always in front. Agassiz, in the first volume of his *Poissons fossiles*, arguing from the fact that the cephalic extension of the *chorda dorsalis* is arrested in the embryo fish at the region of the greater sphenoidal wings, maintained the "existence of only one cranial vertebra, the occipital, the rest of the head remaining foreign to the vertebral system;" this is refuted by Owen, and probably its author does not now adhere to it. Owen also combats the idea of Oken that the head is a repetition of the whole trunk; he maintains that the jaws are not the limbs of the head, but are the modified hæmal arches of the 2 anterior segments; the anterior limbs are diverging appendages of the occipital segment, and the posterior of the pelvic segment with its hæmal arch, both variously displaced from their hæmal arches in different vertebrates. The diverging appendages of the ribs of fishes, reptiles, and birds, arising from their posterior edge, are essentially limbs, rudimentary arms and legs, though they never become such; in this view angels' and Cupid's wings, and the arms of the mythological Briareus, are philosophical possibilities from the development of one or more of these divergent appendages, though zoological nondescripts. As the cranial segments are in number according to the special nerves of sense, so the development of the vertebral bodies and neural arches in the trunk depends on the junction of the nerves with the spinal cord; the condyloid foramen of the occipital bone gives passage in man to the hypoglossal nerve. The cranial bones of fishes are exceedingly complicated, and have taxed the ingenuity of most comparative anatomists, and tried to the utmost the patience of their readers; those who wish to try the experiment are referred to Owen's "Comparative Anatomy of Fishes" and "Homologies of the Vertebrate Skeleton," where the author labors very hard, and not always very satisfactorily, to reduce every thing to his archetype. It will be interesting and instructive to give a few of the most striking characters of the skeletons of the different classes of vertebrates, according to Owen. In the fish not only the jaws, but the arms and legs, may belong to the skull, which accordingly is developed out of proportion to the rest of the body; the diverging appendages of the frontal vertebra are the chain of opercular bones, and of the parietal the branchiostegal rays; of the first spinal vertebra the pleurapophysis is short and simple, and the hæmapophysis is the clavicle; in the abdominal segments the pleurapophyses support simple rays as diverging appendages, and the hæmal arches are fibrous; the hæmapophysis of the pelvic segment is ossified into an ischium sustaining the ventral fins or posterior limbs, in some instances united to a rib; this pelvic arch is most remarkably changed in position, being as above mentioned in the so called abdominal fishes (like the salmon, herring, and pike), or joined to the scapular arch as in the thoracic fishes (like the cod and perch families), according as the ischium is joined to the coracoid by a longer or shorter development. The bony and fibrous parts of the hæmal arches contract rapidly beyond the abdomen; the parapophyses increase gradually, curve downward, and complete the arch as in the cod, or the pleurapophyses contribute to form it with them as in *lepidosteus*, or the arch is closed by the former, with the latter anchylosed below and diverging at the points, as in the tunny. The bodies of some of the terminal segments in typical osseous fishes are consolidated together, and support several neural and hæmal arches and spines, which form the more or less expanded base of the caudal fin. The dorsal, anal, and caudal fins are folds of the skin supported on spines between the neural and hæmal spines to which the fin rays are articulated; they form no part of the typical vertebrate skeleton, and are peculiar to fishes. As compared to his archetype figure, the fish skeleton departs from it in the excess of development, principally in the diverging appendages of the cranium, and in the arrest of development in most of the other segments; the principle of repetition predominates, and the segments resemble each other more than in the higher classes. In the reptile skeleton, the hæmal arches of the anterior 2 cranial vertebræ, the jaws, are more developed, while that of the parietal is feebly so, and they are more or less displaced backward; in the occipital segment the hæmal or scapular arch is still further displaced backward and entirely separated, to it is attached an additional single bone, the humerus, and the divisions of the terminal segments are reduced to 5, a number not surpassed in any of the higher vertebrates. A part of the body of the atlas is developed separately, and is united to the 2d cervical vertebra, forming the odontoid process; the 9 segments after the cranium are cervical vertebræ, movably articulated, the hæmal arches not being ossified, and the pleurapophyses feebly developed, but free or floating; the 9 to 12 following are dorsal vertebræ, the elongated ribs with the hæmal arch completing the circle, the pieces of which are movable; the next 2 are the lumbar, without free and bony ribs, but with hæmal arches; the next 2, united, form the sacrum, bearing the pelvic arch, consisting of pleurapophyses (ilium), hæmapophyses (ischium and pubis), with the divergent appendages of the posterior limbs, a higher development than in fishes; beyond the sacrum all the vertebræ are caudal, in which the pleurapophyses become gradually shorter, a few of the first attached to diapophyses, and the hæmapophyses articulated between and to 2 vertebral bodies. In this class we see for the first time regions of the body. In the bird skeleton the premaxillary is much more developed than the maxillary, the reverse of what is seen in reptiles; the greater volume of the brain requires an increased cranial cavity, which is obtained by the expansion of the neural arches and spines without the addition of any new bones; the cervical segments have short and free pleurapophyses or ribs, which are early united to the neural arches, forming numerous simple vertebræ, and giving length and flexibility to the neck; the detached hæmapophyses of the atlas are usually joined together at their extremities, forming a thin osseous arch, the furcular bone; in the thorax the latter are ossified into sternal ribs, the pleurapophyses being the vertebral ribs, bearing diverging appendages, pointing backward, which serve to unite the ribs and to render the thorax more solid; the hæmal spines of the anterior thoracic segments are developed into the broad sternum characteristic of birds, with its keel on the median line large in proportion to the powers of flight. The sacral region is greatly developed, both in the extent and in the number of bones firmly united to form it, and in its enormous pleurapophyses, especially the ilium; the sacrum includes some of the last dorsal, the lumbar, the sacral, and even some of the caudal vertebræ as limited in the reptile skeleton; after the sacrum come 5 or 6 caudal, more or less united, the last compressed laterally and directed upward. The pelvis has only 2 hæmapophyses, the pubis and the ischium, not united on the median line, except in the ostrich for the former and the nandou (*rhea*) for the latter, the rule being that the pelvis of birds is open below. The diverging appendages of the scapular and pelvic arches, or the anterior and posterior limbs, agree in having only 2 bones in the carpus and tarsus, and 3 united in the metacarpus and metatarsus, supporting in the former the 2d, 3d, and 4th phalanges, that of the 2d very rudimentary; in the metatarsus the 3 bones are, except in the penguins, united for their whole length, including also the 2 tarsal bones; the rudimentary metatarsal of the great toe is not anchylosed, and is directed backward, supporting the hind toe with 2 phalanges; the 2d toe has 3 phalanges, the 3d 4, the 4th 5, the 5th or little toe being wanting; by the number of phalanges we know that, in the African ostrich, the external or shortest toe of the 2 by its 5 joints is the 4th, and the internal the 3d, longer than the other, though having only 4 joints. In the mammal skeleton the cranial cavity is expanded, as in birds, chiefly at the expense of the neural spines, frontal, parietal, and occipital; but in most the squamous portion of the temporal bone forms part of the cranial walls; the occipital is articulated to the atlas by zygapophyses or condyles developed from the neural arches, and the hæmal or scapular arch is generally far removed from the skull; the hæmapophyses of the atlas, or clavicles, vary much in extent, degree of ossification, and even in their presence; the pleurapophyses of the cervical vertebræ are very short, and are generally united to the other elements, circumscribing the foramen for the vertebral artery. The number of the cervicals is 7, except the alleged 6 in the manatee and the 8 or 9 in the 3-toed sloth; this number depends on the existence of the diaphragm, &c., determining the number and distribution of the pairs of cervical nerves; in some whales and armadillos they are more or less consolidated. In the dorsals the pleurapophyses or ribs are movable, and the anterior ones are articulated between 2 vertebræ; the hæmapophyses are the costal cartilages, and the hæmal spines are generally a distinct chain of bones, in the highest consolidated into a sternum; toward the loins the pleurapophyses become shorter, and are attached to their respective vertebral centres and to the diapophyses; the hæmapophyses become shorter, and finally free and floating. The caudals vary much in number, size, and form; the short pleurapophyses in the anterior ones are developed at the end of diapophyses, and the hæmal arch, when it exists, is articulated directly to the bodies. The limbs (except in cetaceans, where the posterior are wanting) are much alike, whether adapted for flying, digging, swimming, running, or climbing, as will be seen under the homotypes below. In the fish and reptile the vertebral column is straight or nearly so; in the bird the skull forms a right angle with the neck, the latter having a sigmoid curve, and the tail bent upward; in the springing mammals, like the carnivora, there is a convergence of the spinous processes toward the 11th dorsal, and in most there is a similar convergence toward the 4th cervical, these two regions being the centres of special movements of the column; in bulky animals, like the elephant, which move with a rigid spine, these processes are all inclined a little backward, as in crocodilians. In man the spine has several slight and graceful curves, destined to prevent shocks to the nervous system from movements incidental to the erect position; the curvature of the sacrum and coccyx are greatest compared with the number of vertebræ, and the anterior and posterior diverging appendages reach the maximum of development, especially the latter as compared to the length of the spine; the thumb, the least constant in the rest of the class, becomes in him the most important, constituting a hand proper; in like manner the great toe, the first obliterated in other mammals, is characteristic of the genus *homo*, as on it depend principally the erect posture and biped gait of man; even the highest monkey has a posterior thumb instead of a great toe. In the class of serial homologies, or homotypes, may be mentioned the homology of the scapula with the ilium, the humerus with the femur, the ulna with the fibula, radius with tibia, carpus with tarsus, metacarpus with metatarsus, fingers with toes; in the skull, the basi-occipital, basi-sphenoid, pre-sphenoid, and vomer are the homotypes of the vertebral bodies; the coracoid, superior maxillary, clavicle, pubis, ischium, chevron bones, sternal or abdominal ribs and cartilages, and tendinous intersections of the *rectus abdominis*, are all homotypes and hæmapophyses. This system of homotypes is far more natural, satisfactory, and intelligible than that of Oken, Spix, and Carus, who speak of the scapula, ilium, femur, humerus, &c., of the head, regarding each part as a repetition of the whole; an idea which Cuvier ridiculed in the most scornful manner.—This is a fair representation of the principal points of philosophical anatomy, as given in the writings of Owen; in many points it is very unsatisfactory, and he labors very hard oftentimes to make out his homologies and to refer them to his archetype. With such sources of error and room for variation, it would be useless to expect perfect agreement among authors; from the nature of adaptive organization, it must be difficult if not impossible to reduce skeletons and their parts to unexceptionable laws; organic systems will not be bound down to any such narrow and clearly defined rules, and are constantly presenting to naturalists instances of inexplicable departure from what have long been considered natural laws; the common fallacy that an exception proves a law plainly shows that many of our most firmly established principles in natural science are but approximations to and fragments of eternal truth. Philosophical anatomy will probably always be an uncertain and ever changing study, assisting but not constituting the science of anatomy. Admitting the 4 cranial vertebræ of Oken and Owen, there may still be recognized with as much propriety other vertebral centres in advance of the vomer, analogous to the coccyx at the other end of the column, with no nerves belonging to them. The usual reason for making 4 cranial vertebræ seems to have been, both with Oken and with Owen, the existence of 4 organs of sense in the head, auditory, gustatory, optic, and olfactory; on this principle there would seem more reason for the admission of only 3. In the first place, there are 3 cerebral vesicles, corresponding to what become cerebellum, optic lobes, and cerebral hemispheres, or according to some anatomists the *medulla oblongata* may be substituted for the cerebellum; in the next place, there are only 3 special senses in the head, hearing, seeing, and smelling, taste being a compound sense, made up of smell and touch; the flavor of substances we get from the sense of smell, as the result of a common cold in the head and of artificially preventing the entrance of air by holding the nose sufficiently show; the rest of the sense of taste is a delicate modification of the sense of touch, placed for protective purposes at the commencement of the alimentary canal; it is absent in many of the lower vertebrates, and has no more claim to be reckoned among the special senses than similar modifications of the sense of touch in the wing of the bat or in the genital mucous membrane; the origin, development, and mode of distribution of the gustatory nerve, which is only a branch of the 5th pair, moreover are not such as belong to special sense organs. There are also only 3 sense capsules in the head, the petrous portion of the temporal bone, the sclerotic in the eye (as in the tunny), and the ethmoid for the sense of smell. As each vertebra of the trunk corresponds to a spinal nerve, there ought to be, according to the view here maintained, 3 pairs of nerves in the head; excluding the 3 special sense nerves, the 1st pair of cranial nerves would be made up of the *motores oculorum*, pathetic, external motor of eye, and the facial (or the 3d, 4th, 6th, and 7th) for the motor portion, and the 5th or trifacial for the sensitive portion; the 2d pair of cranial nerves has the glossopharyngeal and spinal accessory for its motor portion and the *par vagum* for the sensitive; the 3d pair of cranial nerves is the hypoglossal, which, though all motor in man, in reptiles (*frogs*) has the sensory ganglion of an ordinary spinal nerve; in the same manner in reptiles the 7th is seen to belong to the 1st, and the glossopharyngeal and spinal accessory to the 2d series. We have, then, 3 cerebral vesicles, 3 special senses, 3 sense capsules, and 3 pairs of cranio-spinal nerves, which would seem to indicate 3 cranial vertebræ, with a rudimentary nasal or other vertebral bodies in front, without nerves belonging to them, corresponding to the coccyx posteriorly. There is no regularity in the manner in which the nerves, both spinal and cranial, come out of the vertebral canal; the 2d cranial nerve comes out at the jugular foramen, between the occipital and parietal vertebræ; some of the nerves of the 1st pair make their exit from the cranium by the *foramina rotundum* and *ovale*, and some by the sphenoidal fissure, that is, both through the 2d and between the 1st and 2d; in the human spine the nerves come out between the vertebræ, but in the dorsals of many mammals they pierce the middle of each vertebra. As to the hæmal arches, Prof. Owen finds it very difficult so to divide his tympanic series as to get the hyoid arch and lower jaw as appendages to the 2d and 3d vertebræ; there is considerable doubt as to whether the diverging appendages of the cranial vertebræ are as yet properly determined. Admitting 3 cranial vertebræ, with a rudimentary 4th or nasal centrum, let the occipital segment claim the scapular arch; the lower jaw may be appended to the parietal and the upper jaw to the frontal segment, the hyoid arch, as Carus and others maintain, being placed with the tracheal rings in the splanchnoskeleton; or, leaving the hyoid arch in the endoskeleton (which is probably more correct), and pertaining to the parietal segment, the upper and lower jaws may be made the double hæmapophysial appendages to a single rib, as the ischium and pubis are to the ilium. There are some facts favoring the latter view, such as the development of both jaws from a single arch; in the cyclostome fishes the mouth is an arch, in which it is hard to say which is upper and which is lower jaw; in *myxine* there is no under jaw, the inferior portion of the mouth being made up of the anterior part of the tongue bone. Not to multiply instances of other doubtful and debatable points, these will suffice to show that philosophical anatomy has not yet reached a positive and unassailable foundation.—Though Owen's conclusions are accepted by most anatomists as coming nearest the truth, Mr. Maclise, in the article "Skeleton" of the "Cyclopædia of Anatomy and Physiology" (vol. iv., London, 1852), looks at the osseous framework from another point of view, and comes to very different results, at only a few of which can we glance here. He denies that there is any such *ens* as a typical vertebra, and maintains that vertebræ are unequal quantities, varying in different regions of the trunk; according to him, the cervical, lumbar, and sacral vertebræ develop costal appendages as well as the dorsal; the first 7 thoracic costo-vertebral figures are complete, and all other parts of the mammalian spinal axis are more or less modified from this archetype; the mammalian cervix is not limited to 7 vertebræ, and may contain from 5 to 9 without anomaly, the number depending on how many have the ribs developed only to the cervical degree; all the spinal segments of the vertebrata are only as the variable proportionals of sterno-costo-vertebral archetypes. The hyoid apparatus consists of the metamorphosed ribs of the cervical vertebræ, and the ventral apparatus (as in the crocodilians) of those of the lumbar; clavicles and coracoid bones he regards, like ribs, as identical parts of the costo-vertebral archetype, and as belonging, not to the atlas, but to the 7th cervical vertebra; in like manner, marsupial bones, pubic and ischiatic bones are rib-like in their nature, and belong to the lumbar and sacral vertebræ. In the head he makes 6 vertebræ: 1, occipital, the rib and sternum being the styloid process and the upper half of the hyoid bone with its lesser cornu; 2, petrosal, with its costo-sternal quantity the tympanic bone coiled upon itself and enclosing the bones of the ear; 3, temporal, having no centrum, but the temporal and parietal bones for neural arch and spine, the lower jaw articulating like a rib to the glenoid cavity; 4, post-sphenoid, with greater sphenoidal wings for neural arch, and the zygoma and upper jaw for rib and sternum; 5, anterior sphenoid, with lesser wings for neural arch, and palate bone for costo-sternal portion; and 6, ethmoidal, with the ethmoid for centrum, frontal for neural arch, and nasals for rib and sternum. The lower portion of the hyoid bone with the greater cornu is the sternal quantity and rib of the atlas, the thyroid cartilage of the axis, the cricoid of the 3d cervical, the tracheal rings of the 4th, 5th, and 6th, and the clavicle of the 7th cervical. He makes out these 6 cranial vertebræ also from the disposition of the nerves; as in the spine a nerve passes between 2 adjacent vertebræ, and 5 nerves would correspond to 6 vertebræ, he finds 5 cranial nerves for his 6 cranial vertebræ; the 1st nerve is the olfactory; the 2d, a group containing the optic, 3d, 4th, and 6th nerves, motor and sensory, passing through the *foramen lacerum;* the 3d, branches of the 5th passing through the *foramen ovale;* the 4th, the auditory and facial; and the 5th, the par vagum, glossopharyngeal, &c. The fore limbs are homologous to one another and to the posterior limbs; the scapula and ilium are the homologues of the posterior laminæ of a dorsal vertebra, the acromion and inferior iliac spinous processes correspond to transverse processes, and the head of the humerus and femur to the head of a rib.

PHILOSOPHY (Gr. φιλος, loving, and σοφια, wisdom), the universal and absolute science, aiming to explain phenomena by ultimate causes; to grasp the nature of real as distinguished from phenomenal existence; to systematize the forces and the laws which prevail in the activities of God, man, and nature; to reduce the universe to a principle of unity; and to exhibit at once the impulse and the goal of destiny. The origin of the name is, upon questionable authority, attributed to Pythagoras, who preferred to be called a philosopher, or lover of wisdom, rather than a sophist or sage. It was appropriated and first popularized by Socrates, who made it the distinctive appellation of his teaching in contrast to the arrogant designation of the sophists. Originally assumed in modesty, the term did not retain its etymological and Socratic meaning, but returned to that of σοφια, or wisdom. Among the most significant definitions of philosophy are the following: "the knowledge of things divine and human" (attributed to Pythagoras); "a meditation of death" (μελετη θανατου), and "a resembling of the Deity in so far as that is possible to man" (Plato); "the art of arts, and science of sciences" (Aristotle); "that part of human learning which hath reference to the reason" (Bacon); "the science of things, evidently deduced from first principles" (Descartes); "the science of effects by their causes, and of causes by their effects" (Hobbes); "the science of sufficient reasons" (Leibnitz); "the science of things possible in so far as they are possible" (Wolf); "the science of the connecting principles of nature" (Adam Smith); "the science of truths, sensible and abstract" (Condillac); "the science of the relations of all knowledge to the necessary ends of human reason" (Kant); "the science of the original form of the Ego, or mental self" (Krug, with which that of Fichte substantially agrees); "the science of the absolute, or of the absolute indifference of the ideal and real" (Schelling); "the science of reason, in so far as the latter is the conscious idea of universal being in its necessary development" (Hegel); "the substitution of true ideas, that is, of necessary truths of reason, in place of the oversights of popular opinion and the errors of psychological science" (Ferrier); "the knowledge of effects as dependent on their causes" (Sir William Hamilton); "the science of first principles, that, namely, which investigates the primary grounds, and determines the fundamental certainty, of human knowledge generally" (Morell); "the science of the ultimate principles and laws of nature and freedom, as also of their mutual relations" (Tennemann); "the science of the reason of things" (Alaux); "the explanation of the phenomena of the universe" (Lewes).—Philosophy agrees with religion in revealing the infinite, in regarding individual objects as products or shadows of an ultimate absolute principle. But it requires evidence and logical sequences, while religion rests upon mystery and faith, upon instinctive and spiritual certainty. The one systematizes the totality of things in the domain of knowledge, the other in that of feeling. In the order of history religions are the preludes of philosophies. The former divinize phenomena, the latter establish between them relations of cause and effect. Faith grasps the substance, reason furnishes the form. The mode of conception and statement in the two are entirely different. Philosophy gives *explicite* the abstract ideas and tendencies which are involved *implicite* in the conceptions of religion. Poetry or art also, like philosophy, is a revelation of the infinite; but its ideal is beauty, while that of philosophy is truth. The one moves according to principles of taste, the other by logic; the law of the former is the imagination, that of the latter the reason. A complete philosophic system may have an æsthetic character, and a finished work of art may be analyzed as philosophy analyzes the universe; yet if each were perfect, the former would be abstract and absolute, the latter would be concrete, an imitation, but not an explanation or a justification, of nature. Philosophy, as the science of ultimate principles, differs from special sciences whose objects are finite phenomena and proximate causes. It transcends them, and deals with objects only in the light of the absolute. Even the whole circle of the natural sciences does not constitute a system of philosophy, which, if empirically established at all, would only be so by combining the results of all departments of scientific inquiry as the basis of a higher generalization. Each particular science seeks a principle of unity, a force and law which will account for the phenomena in its own realm. This principle becomes an element in universal science or philosophy, which seeks after absolute unity. The individual has the ground of its existence in the species, the species in the genus, the genus in some broader classification, and so on till an ultimate substance be reached, from which all things are developed, and which is the goal of philosophy. The final attainments of the sciences are the elementary data of empirical philosophy. Yet philosophy, in its higher manifestations, has not started from the results of science, but from the suggestions of consciousness and the postulates of reason.—Philosophy embraces the two departments of psychology, which investigates the faculties and operations of the human mind, and ontology, which seeks the nature and laws of real existence. The former deals with the phenomena of consciousness, the constitution of the mind, the laws of thought; the latter with the essential characteristics of being *per se*, the constitution of the universe, the laws of things. The former is descriptive, and the latter scientific metaphysics. The transition from the one to the other, the demonstration of objective reality from subjective conception, is the leading philosophical problem. The aim of psychology is the description and analysis of mental experience. Even when combined with logic, it can furnish a knowledge only of phenomena and relations. It marks, first, the changing facts which succeed each other in the mind; secondly, the faculties or permanent powers to which these facts are severally related; and thirdly, the affirmation of personal existence and identity. The multiplicity of facts are all manifestations of powers of thought, feeling, and volition; and these powers are the diverse operation of a simple personal principle which we accept as an axiom of consciousness. *Cogito, ergo sum,* the Cartesian proof of personality, of the distinction of one thinking being from every other, remains true, though the mind be regarded as a collection, not of faculties, but of sensations, as by Condillac, or of impressions and ideas, as by Hume, or of categorical laws, as by Kant. The phenomena of consciousness, however classified, are usually distinguished as sensitive, intellectual, and volitional. To the first class belong sensations and emotions, the former an affection through the body, the latter through the mind. To the second class belong perception through the organs of sense; conception, when these organs are not concerned; memory, which is conception with individual recognition; imagination, by which conceptions are combined in a different order from any in which the originals were perceived; belief, with or without evidence; and reasoning, which is either contingent or demonstrative. To the third class belongs only the act of willing, but as this may be exerted in the control of other mental operations, there results a new class of mixed intellectual and voluntary operations, as attention, abstraction, comparison, classification, generalization. The term ontology, which by present usage means the same as the ancient metaphysics, was first introduced into philosophical language by Wolf to designate the primary department in his quadruple classification of philosophy—psychology, cosmology, and theology being the other three. He intended by it the science of abstract (not absolute) as distinguished from real being, the science of the possible, of the necessary and contingent, of quantity and quality, of substance and accident, &c. It expounded rational laws, without reference to whether any thing actual obeys them, or to the laws of intellect by which we believe them. Kant condemned under this name the whole theory that our subjective ideas imply real objects, veritable existences, corresponding to them, and particularly confuted the ontological proof of the divine existence. From his time ontology has been opposed to psychology, and comprehends investigations into every real existence, which, without being a direct object of consciousness, may be deduced from the possession of certain feelings, or principles, or faculties of the human soul. Its three objects are the soul, nature, and God, to which correspond Kant's three ideas of pure reason, and the three departments of rational psychology, cosmology, and theology. Its goal is an organic system of the spiritual and material universe, an intuition of unity. The whole modern philosophy of the absolute is ontological, while positivism denies that we can pass beyond the phenomenal, and Sir William Hamilton denies that we can be scientifically certain that our faculties adequately represent objective realities. —Every system of philosophy is the speculative development of a principle, a coherent chain of thoughts, whose first member is accepted as an axiom, and whose last is the remotest consequence resulting from it. Between the two lie all the phenomena of the universe and of human life. Systems develop progressively what the reason contains as a possibility and demands as an ideal. The adherents to the method and tendency of a system constitute a school of philosophy. The system is developed by analytical or synthetical processes, according as the goal to which it tends or the axioms from which it proceeds were first apprehended by the mind. A principle being given, synthesis unfolds it till it takes in the totality of things in its consequences. A result being assumed, analysis considers the road which must be followed and the premises which must be framed to justify it. The order and direction of ideas are diametrically opposite in the two procedures. If the thought be analytical, the guiding point is a problem, a goal hovering before the mind to be attained at all events. If the thought be synthetical, the guiding point is an axiomatic premise, and the course of ideas is but a series of legitimate conclusions. The former method is that of solutions, the latter that of deductions. They are counter-processes, correcting each other, analysis being properly the foundation and synthesis the conclusion of philosophical thought. Historically the latter usually precedes the former, furnishing the preconceived hypothesis which guides analytic researches and which is confirmed or corrected by them. Boldness in synthesis has been more common than precision in analysis. "With regard," says Samuel Bailey, "to the philosophy of mind, which must always constitute the foundation of non-physical science of every description, I venture to repeat the prediction that no great progress will be made by those who prosecute it, and that they will continue to move in a circle, until they consent to do what successful physical inquirers do, namely, to dismiss all figurative statements of fact, all fictitious entities and occurrences, all abstractions except as mere forms of expression, all hypotheses except such as may be professedly put forth in the character of tentative suppositions; and to confine themselves to real objects, actual events, literal statements, and rigorous conclusions." Carus describes the history of philosophy as "the natural history of the human reason, its pursuits and products." It presents a genealogy of systems, and shows the progress of reason through abstract schemes like that of the soul through successive religions and civilizations.—It is a peculiarity of Indian speculation that it esteems life the greatest of evils, and looks to annihilation as the highest bliss. To extinguish individuality in absorption, to close the circle of metempsychosis, to be finally rid of being, is the goal to which both religion and philosophy point. The orthodox and probably oldest system of Hindoo philosophy is that of the Vedanta or the Mimansa. It embodies traditions of Brahminism, interpretations of the Vedas, and results of speculation. The second Mimansa, which is specially called Vedanta, develops the idea of Brahma as at once the operative and material ground of the universe, both the principle and the result of creation, both immanent in the world and transcendent above it, both the source and destiny of all things. Return into Brahma and blissful extinction is the desire and goal of all souls. Unable to determine the relation between Brahma and the world, abstract essence and concrete nature, being and becoming, rest and movement, unity and multiplicity, Indian philosophy divided into two schools, which respectively maintained Brahma and the world as the only real existence, each excluding the other. According to the Vedanta, the world is a delusion, a phantom, like the image of the moon on water; the senses are deceptive, and Brahma alone exists. The phenomenal universe is the mistake of our own eyes, and our subjective conception of self or of any distinction between the person knowing and the thing known is in like manner false. The wise man escapes from the snare of this distinction, and from all unreal appearances, and rises to unimpassioned repose, pure contemplation, transcendent freedom, to union with Brahma. He becomes conscious of himself only as the changeless, eternal, and universal Brahma, and the whole circle of individual life, birth, old age, and death, is to him but a phantasm. Asceticism is the ethical result from this theory. The Sankhya philosophy, whose mythical founder was Kapila, is the rationalism of Brahminism, and starts from the dualism of spirit and matter, unlike the Vedanta, which identifies subject and object. It regards spirit not as the pervading soul of the world, but as an infinitude of individual souls, which from the beginning have acted in union with nature. Every soul, when it has once penetrated the mask of material things, and discovered its own absolute independence, attains a pure gnosis, but may continue to exist though its end be gained, as a wheel may still roll after the impulse has left it. Thus illumined, however, it obtains a final and absolute liberation from life at the death of the material body; but of its former condition, whether any conscious or unconscious personality remain to it, nothing is said. As the Vedanta doctrine proceeds from the idea of abstract unity and substance, the Sankhya proceeds from the data of individual consciousness, from the antagonism of the individual soul and nature. The former declares the phenomena of this antagonism unreal and delusive; the latter denies an all-absorbing divinity. The goal of the soul, according to the one, is absorption into Brahma, and according to the other, escape from nature. In either case, the soul once free is subject to no further peril of existence. Beside these two principal systems, there are the Nyaya (logic), the atomistic Vaiçeshika, and the later Yoga, which aimed to unite with the Sankhya theory the idea of a creative Deity. The Nyaya, ascribed to Gautama, though it contains no account of the syllogism and is but a superficial code of ratiocination, has had an influence on all the schools of India corresponding to that of the *Organon* of Aristotle on western philosophy. The Vaiçeshika regards the universe as composed of eternal atoms, which it reduces to 6 categories, 9 substances, 24 qualities, and 5 movements. The Yoga is a system of mysticism, inculcating the union of the individual with the infinite soul in contemplative ecstasy. The whole Indian philosophy has in connection with its ontological doctrines a psychology of remarkable subtlety and obscurity. In no other country has the struggle between matter and spirit, sense and reason, been more strikingly characterized. Spirit and reason triumph, but only to extinguish every finite personality in one infinite life.—The basis of Chinese philosophy is the book of principles (*Y-King*, "Transformations") attributed to Fu-hi. The lines which he is supposed to have inscribed on the back of a dragon are abstract categories of the ethical and physical worlds. A continuous straight line represents the heaven, and a broken line the earth, and their combination according to a numerical law explains all things. The senses thus triumph in the efforts of the reason, making a system of linear symbolism. In the 6th century B. C., Lao-tse and Confucius became the chiefs of opposite schools. The former, from the hypothesis of a primordial unity, explains the origin and destiny of beings by a scheme of pantheism; the latter, avoiding purely speculative questions as inaccessible to the reason, sought only a practical philosophy as a means of moral perfection. Preeminent among the disciples of Confucius was Mencius. His precepts were founded on no theory of virtue, and had no reference to a divine power. A school of Neo-Confucianism was formed about the 10th century, the founder of which was Tcheu-lien-ki, and the chief Tchu-hi, which treated specially of cosmology. An original principle, having both active and passive modes of being, and generating the 5 elements, fire, water, earth, wood, and metal, from which all things proceed, is the fundamental conception of the system. Man is the flower of creation, but though his soul returns to heaven after death, it loses its personality. The whole Chinese philosophy seems but the effort of a prosaic people to give a light-and-shadow sketch of the more palpable facts of heaven, earth, and man.—The Persian dualism and the Hebrew monotheism belong to the history of religion rather than philosophy; and the wisdom of the Egyptians is known to us chiefly from its supposed influence on Greek speculation. In Greece first, says Hegel, was the light concentrated into the lightning of thought. The first problem of Greek philosophy was to explain the enigma of external nature, to account for the spectacle of the material universe, to solve the problem not of the soul but of the world. By an imperfect analysis some hypothetical element was attained, which by a hasty synthesis was integrated into the principle of all things. The Ionic and the Italic schools, which on opposite sides of the Greek peninsula opened the series of Hellenic speculations, embodied this tendency. Thales of Miletus (about 600 B. C.), the first of the Ionic philosophers, made water the primal and universal principle, the fundamental agent in creation and movement. He thus conformed to the poetical tradition that "Oceanus is the father and Thetis the mother of things," but has the merit of advancing from a mythical to a scientific representation. His disciple Anaximander assumed as the original essence an ethereal principle, filling space, which by successive combinations constituted the universe. He seems only to have given a philosophical expression to the conception of chaos in the old cosmogonies. Anaximenes, the third of the Ionic sages, made air the original element, from which by rarefaction and condensation he derived all things. Thus water, an original chaotic matter, and air were the three substrata to which Ionic speculation attained as the ultimate principles of unity and goals of philosophy. The Italic school, represented by Pythagoras (540-510 B. C.), advanced from a sensuous to a symbolical principle. Number is made the essence of the mental and material universe. The occult relation of numbers is the key to philosophical attainments. The harmony of the universe and the music of the soul are the highest objects of knowledge and culture. Thus the relations and harmonies of existence take the place in Italic speculation which had been occupied by substance and cause in the Ionic. The latter, also, limited itself to physical nature, while the former reduced the moral and material worlds alike to a principle of rhythm. Another step in advance was taken by the Eleatics, who, transcending both a sensuous and a symbolical ultimate principle, conceived of one sole substance as the only true being, and pronounced the phenomenal world an empty appearance. An immutable and eternal principle of intelligence was thus attained. "One and all," was the motto of Eleatic speculation. Its pantheistic character, incompletely developed in Xenophanes, who conceived of the Deity as symbolized by a sphere, was perfected by Parmenides (460 B. C.), who represented the absolute being as affected by love, yet without relation to space or time, divisibility or movement, and who therefore could not account for the phenomena of multiplicity and change. Melissus and Zeno continued this tendency, and in the interest of pure being sacrificed nature and all finite existence. The transition from abstract to concrete being, from the Eleatic principle of unity to the world of phenomena, was attempted by Heraclitus (about 520 B. C.). "Every thing flows," was his motto, and he thus introduced a principle akin to the German conception of becoming (*werden*). An original energy was substituted for the Ionic original matter and for the Eleatic universal but abstract being. The flux, which constitutes the world, is the product of conflicting opposites, of the One warring with itself and harmonizing with itself, like the accord of the bow and the viol. An all-pervading fire is the principle of formation and dissolution. The attempt to account for perpetual flow and movement gave rise to new theories of the origin and principles of nature by Empedocles (440 B. C.) and the atomists. The former, a thaumaturgic naturalist, originated the theory of the 4 elements, fire, air, earth, and water, which dwelt together by the principle of friendship, till strife broke their union, and occasioned the formation of the world. Thus in connection with the elements he introduced two moving powers, combining the love of Parmenides with the conflict of Heraclitus. The soul he regarded as formed from the 4 elements, and having its seat chiefly in the blood. Leucippus and Democritus (about 400 B. C.), who represent the atomic philosophy, supplanted the 4 elements by an unlimited number of constituent atoms as the ground of things, and the moving energies of love and conflict by unconscious necessity. Atoms, of like quality but unlike form, moving eternally in a vacuum by an absolute law, constitute the universe. According to Democritus, the soul consists of globular atoms of fire, and thought is derived from impressions on the senses by images that emanate from external objects. "Parmenides, Heraclitus, and the atomists," says Hegel, "all sought for the abstract universal. Parmenides found it in being; Heraclitus in the process of being *per se*; and the atomists in the determination of being *per se*." The atomic system was more complete than any that preceded it, and may be called the perfection of a purely mechanical explanation of nature, since all subsequent atomists have only repeated its fundamental conceptions. Anaxagoras (born about 500 B. C.) rose above any materialistic philosophy of nature, and recognized by the side of matter a superior world-forming intelligence, working freely and by design. "When," says Aristotle, "he announced that in nature, as in men, there was a mind causing the arrangement and order of the universe, he seemed alone to have preserved his reason amid the follies of his predecessors." He rather postulated than developed the doctrine of mind as the superior and vital energy of nature; and Plato therefore complains that he gave a mechanical instead of a truly teleological view of the origin of being, introducing only a *deus ex machina* to explain effects for which no other causes appear. Yet a spiritual principle, apart from matter, was now attained as the result of the effort to conceive how the cosmos began and continued to move. A breach was thus effected between the subjective and the objective; the soul no longer sought the truth abroad, but in itself; and the sophists were able by subjective dialectics to deny objective reality. Though the sophists were, according to Grote, a profession of teachers and not a sect of theorists, and though they had no body of common doctrines, yet the general tendency of their speculations was sceptical. With the motto of Protagoras that "man is the measure of all things," they developed the principle of subjectivity to the destruction of the authority of custom, law, and religion, the validity of reason, and any solid foundation of truth. While they tended to overthrow the whole edifice of thought which had been thus far built up, Socrates (470-399 B. C.) created a new epoch in philosophy by directing observation on man himself for the purpose not of denial but of affirmation. The subjectivity which they regarded as empirical he made absolute; and henceforward the study of mind became the prime and central object of philosophy. He availed himself of self-consciousness to establish, as they had done to destroy, a true objective world. Hegel has remarked that in pronouncing Socrates the wisest of men the Pythia virtually abdicated; from that time oracles for the conveyance of truth from without should be silent before the power of inward reflection. Confining his study to human as distinguished from divine affairs, he sought to establish the notions of moral and religious obligation, and left the single positive doctrine that virtue is knowledge or wisdom, a foundation stone in the scientific treatment of ethics. He gave to philosophy definition and induction as its method, self-knowledge as its point of departure, and moral perfection as its goal. His partial disciples were Antisthenes and the cynics, Aristippus and the Cyrenaics, and Euclid and the Megarians. Each of these adopted from him the principle that all men should have one supreme aim after an ideal perfection. The cynics sought after a life according to nature, in contempt of customs, arts, sciences, and even personal wants; the Cyrenaics made it the chief end of man to follow the instinct of pleasure, making present enjoyment the test of wisdom and virtue; and the Megarians applied Eleatic dialectics to ethics. These schools prepared the way respectively for Epicureanism, stoicism, and scepticism. The interpreter of the Socratic philosophy, the first who attained to a systematic representation of the world of ideas, was Plato (430-347 B. C.). Beginning with the soul, as an independent existence, he distinguishes in it two components, the divine and the mortal, the reason and the appetites, which are united by an intermediate link, the heart (θυμός) or generous sentiments. The activity of the soul culminates in the pure thought of the reason. To explain its connection with matter, he refers to its origin. In the beginning, in the choir of gods, it moved happily around the divine essence, in the contemplation of which it delighted. Misled and fallen, it lost its wings, and is confined in the body as a place of expiation. Still, amid the miseries of the present life, it sometimes recalls dim reminiscences of its former state, of the truth and melody in which it then lived. All philosophy is reminiscence. The earth is as a cavern open on one side to the light, in which the prisoners only see the shadows and hear the echoes of the voices of the persons without. The luminous external region is the region of ideas. By purification and discipline man rises through opinion, belief, and rational knowledge to that pure intuition which introduces to this higher realm. The culture of the sciences, of geometry, astronomy, and music, is preliminary to dialectics, whose function is to distinguish what is phenomenal and accidental in things from what is essential, permanent, and ideal. It thus grasps beneath the current of phenomena the types which are eternal. The highest idea, and the ground of all other ideas, is that of the good, at once moral and metaphysical, which is the goal of thought, as the idea of the beautiful is the goal of love. The Deity is the architect of the world, which he has fashioned in his likeness, making it an organism of order and beauty. Man, also, should aspire after resemblance to God, and should reflect the divine ideas in his own works. In a polytheistic age and country, Plato placed a paternal Providence; while his contemporaries wasted their energies in the sterile contemplation of phenomena, he revealed divine types; amid thinkers who were certain of nothing, he was the preacher of immortal being. His theories have reappeared in special power whenever the human mind has risen from repose or from errors to advance to a higher stadium in its progress.—While Plato esteemed only abstract types, Aristotle laid stress on concrete individualities, assailed the theory of ideas as baseless and fantastic, and proposed instead the theory of causes. He recognized four metaphysical causes or principles, matter, form, motive power, and end, which all resolve themselves into the fundamental antithesis of matter and form. The form, which is life, being added to matter, to which also is ascribed an element of desire, transforms potentiality into actuality; thus a statue results from matter in the quarry and form in the mind of the artist, and nature is but an evolution of the forms of divine intelligence. These forms, unlike the Platonic ideas, are not accomplished, self-subsistent, and permanent entities, but constitute at once an eternal energy or entelechy and its eternal product. The actual does not follow but coincides with the potential; the form or essence of nature is nothing else than the way to nature, its realizing activity and also its proper end. The ideal and real elements which Plato had set apart were thus closely bound together. Forms, as motive principles pervading the universe, have their source in God the first mover, who is being in perfect activity, and bears nothing in himself which is merely potential. As Platonism culminated in the conception of ideas, Aristotelianism culminated in that of motion, energy, or life, working in all things, and the ground of their existence and development. Reality belongs only to particulars; complete knowledge requires complete experience; but all possible determinations of being are contained in 10 categories, their relation to which may be discovered by syllogistic reasoning. The Aristotelian system of logic was scarcely improved until the present century. The systems of Plato and Aristotle are illustrious examples of the ideal and real, or *a priori* and *a posteriori* schools, which have existed in every age of speculation.—The decline of the Greek spirit and civilization was marked by three systems of philosophy, conceived with indifference to speculative truth. The scepticism of Pyrrho denied the possibility of certitude concerning any thing objective, and proposed a thoughtless and aimless acquiescence in the impulses of nature as the law of life. His system was maintained by the leaders of the new academy, Arcesilaus and Carneades, and anticipated the absolute doubt of Ænesidemus and Sextus Empiricus. Epicurus proposed as the goal of philosophy a scheme of morals that should inevitably lead to happiness. The aim of his physics was to rid mankind of the terrors that come from belief in God and immortality, and the aim of his logic was to banish the troubles that come from error. The universe is an aggregation of atoms, moving by chance; the soul terminates with death; and in a remote space the gods lead a changeless, careless life, ignoring all management of affairs. Plutarch reproached this system with total sterility of great men and great actions. Stoicism, on the contrary, was recommended by its heroes. Founded by Zeno, and developed by Cleanthes and Chrysippus, it sought to establish a discipline of virtue in an age of degeneracy. Assuming that all the materials of knowledge are furnished by sense, it maintained that assent or the free exercise of reason is also required to constitute opinion, and thus proposed a subjective criterion of truth. Nature is composed of passive matter and active ruling reason, and to live harmoniously with nature or conformably to reason is the moral law. Intellectual or rational existence is thus alone recognized; passions, pleasures, and pains are to be ignored and despised.—The Romans, to whom the results of the Greek schools were made known by Cicero, originated nothing in the progress of philosophy. Epicureanism was represented among them by Lucretius, and stoicism by Seneca, Epictetus, and Marcus Aurelius, but neither acquired new speculative elements: the former inspired the lower, and the latter, which was an anticipation of the national genius, inspired the higher qualities of Roman life. Seeking only a rule of conduct and government, excelling only in the arts of legislation, they aimed to apply rather than discover principles, and borrowed the ideas not only of Greece, but also, through the Ptolemies and Seleucidæ, of Egypt and Asia.—In Alexandria, where the Orient and the Occident, and the three great religions, Judaism, Christianity, and paganism, came into contact, the genius of antiquity made its last efforts in philosophy. The leading systems had degenerated into matters of tradition and erudition, when the Alexandrian Neo-Platonic school sought to combine in opposition to Christianity the most brilliant elements of classical and oriental speculation. Hellenic ideas were mingled with a vague symbolism, with theories of ecstasy and divine union, and with the chimeras of theurgy. The result was at once a philosophy and a religion, an original creation and an eclectic *résumé*. Founded by Ammonius, it continued nearly 4 centuries, till with the death of Proclus, in A. D. 485, the golden chain of the Platonic succession was finally broken. Its chief thinker was Plotinus, whose writings contain the germs of the whole doctrine ascribed to Orpheus, Pythagoras, and Plato, and who was a Platonist in method, a mystic in temper, and a pantheist in his results. He was succeeded by Porphyry and Iamblichus, who sought from polytheism and demonology magical powers and religious inspiration for the revival of philosophy, and who made the school the centre and representative of paganism on the eve of the conversion of Constantine. The fruitless career of Julian, the fate of Hypatia, the vigorous controversies of the fathers of the church while the philosophers occupied themselves with commentaries, had proved their cause to be desperate, when Proclus made the last protest against the triumphing religion. Philosophy had now transferred its seat to Athens. He was a type of the luxury of mysticism, and amid the severest asceticism, while insensible to outward impression, avowed that his imagination enjoyed all the delights of sense. His system, like that of Plotinus, confounds man and God, matter and spirit, nature and the creator. He admitted and admired an original and perfect unity, but declared it superior to existence, and separated it from reality and life, reducing it to an abstract conception. The origin of the world he explained by hypostases distinct from this supreme principle. The most eloquent of hierophants, rather than a philosopher, he has been called the pontiff of all religions, and, excepting the Christian, he sang the praises of all gods. Greek philosophy terminates with the closing of the schools of Athens by Justinian in 529.—The period of the scholastic or mediæval philosophy has been called an interregnum in the history of the human mind, when faith occupied the throne of reason. Two distinct currents run throughout scholasticism: the one, rigorously logical, derived from Aristotle and Boëthius; the other, wholly mystical, derived from the Neo-Platonists of Alexandria and Athens through Scotus Erigena and Averroes. In religious and social influence, in general dominance over the habits of thought and life, mysticism was the leading element in the middle ages. After the closing of the schools of Athens by Justinian, and the dispersion of the philosophers, Arabia and France became the centres of philosophical speculation. Philoponus, Damas, and other peripatetic Christians presided over the intellectual development of the Arabians, and interpreted to them the writings of Aristotle. The patronage of the caliphs Haroun al Rashid and Almamoun, about the time of Charlemagne, made the Arabians preeminent for scientific studies. As learned Aristotelian logicians Alkindi (800) and Alfarabi (died in 954) excelled. Al Ashari and his disciples sought to solve the problem of evil by the synergy of the divine and human wills. Avicenna is the principal representative of the physical speculations of the Arabians. Applying to the universe the forms of logic and metaphysics, he developed a fantastic system founded on a sort of alchemistic mysticism. Certain material abstractions were made the principles which by combination and by clothing themselves with accidents evolved the physical world. Algazzali, an absolute sceptic, and also one of the most zealous Mussulman theologians, denied the foundation of all philosophical systems whatsoever, and affirmed that the revelation of the Koran was the only resource against universal doubt. All of these reproduced peripateticism in different phases, but the oriental mystical tendency prevailed in other thinkers. Tophail of Cordova wrote a romance entitled the "Man of Nature," the hero of which rises through many degrees of contemplation to a union with the Deity. Averroes explained the origin of things by the doctrine of emanation, each object developing its form from an inward germ, and distinguished in the soul the active and the passive intellect, the former of which knows universal truths and is a common substance in all men, and the latter deals with material phenomena and is a special substance in each man. Thought is a product from the union of these two faculties. Theology he regarded as an expression of relative truth, of vulgar beliefs, while to philosophy alone belonged the province of absolute truth. Some of his doctrines were developed by his disciple, the Jew Maimonides. The Mussulman theologians declared that the philosophic schools were of fatal injury to religion, and the philosophers maintained against all the sects the eternity of matter and the limitation of the divine knowledge to the general laws of the universe. The speculations of Arabian scholars transmitted the forms of the Aristotelian logic, with which Christianity next came in contact after its conflict with Neo-Platonism. Scholasticism, a philosophy of dogmas, resulted from this synergy of faith and reason, and dominance of the former. Its elements were doctrines which the authority of the church made indisputable, and which were esteemed absolute truth; its aim was to interpret, not primarily man or nature, but the creed, to give to the contents of revelation a scientific form; and its method consisted in drawing inferences from acknowledged statements, and accumulating distinctions concerning words. Propositions were substituted for the *a priori* numbers, ideas, and forms of ancient philosophy, and syllogistic reasoning, founded on them as premises, became the only instrument for the discovery of truth. The facts of nature were overlooked in the development of an artificial logical scheme; and Roger Bacon alone seems to have regarded experiment, even in physics, as fit to precede and guide rather than to follow and illustrate theories. The objective world had lost its dominance in philosophy with the decay of the Hellenic life, the mind was turned back upon itself, and the problem of being was raised under the form of questions concerning the nature of our ideas of universals and individuals. The first period of scholasticism, from the 9th to the 11th century, represented by Erigena and Anselm, displays a blind but absolute realism, holding to the objective reality of generic ideas. Erigena by his unrivalled erudition, which is supposed to have included an acquaintance with Indian speculations, gave the impulse, and Anselm by his motto, *Credo ut intelligam*, gave the direction, to philosophical thought. The latter first proposed the ontological proof of the divine existence, founded on our idea of infinite perfection, which was afterward revived by Descartes. In the second scholastic period, extending to the 13th century, Roscellinus combated Anselm by ascribing to every generic or universal idea only a verbal reality, affirming it to be a vain abstraction of the mind, and thus introduced the controversy between the nominalists and realists, which Abelard sought to reconcile by the doctrine of conceptualism. Hugh and Richard de St. Victor and St. Bernard indicated a mystical tendency, a reaction against the reigning dialectics, while Peter Lombard, the "master of sentences," appealed to positive studies, collecting extracts from the church fathers without attempting to solve difficulties, and John of Salisbury ridiculed the current abuses of logic. The classical period of scholasticism was the 13th and 14th centuries in which flourished its two greatest masters, the Dominican Thomas Aquinas and the Franciscan Duns Scotus, in which realism was triumphant, and in which the Arabico-Aristotelian system was completed. The entire works of Aristotle were now first introduced from Constantinople. In discussions whether universals existed *in posse* or *in esse*, and concerning human liberty and the grounds of virtue, the Thomists exalted the understanding as the highest principle of the mind, and the Scotists exalted the will or the power of determining universals to particulars. To this period belong Alexander of Hales, Albertus Magnus, and the mystic Bonaventura. Nominalism was revived by Occam, and by distinguishing thought from being, and separating the theoretical from the practical, its effect was to give to philosophy a wider range and freer spirit. Amid the discussions of this later period of scholasticism, Raymond Lully cultivated a cabalistic natural science, under the forms of a mechanical logic, and Tauler and Gerson took refuge from the disputes of the schools in religious mysticism. The fruitlessness of the scholastic method as a means of discovery, and its inability to contain and systematize the growing knowledge of physical and historical facts, was the occasion of its overthrow. The transition to modern philosophy is marked by three classes of reformers, with respectively ideal, empirical, and mystical tendencies. To the first belong Ficino, who revived Platonism at Florence, Ramus, an able and violent opponent of the Aristotelian logic, and Giordano Bruno, the most interesting thinker of his age, who with the genius of a poet and wit as well as philosopher reproduced the Alexandrian pantheism. To the second belong Telesius, who maintained that heat and cold are the only immaterial and active principles, Pomponatius, and especially Campanella, who with mingled irony and seriousness aspired to reform every art and science, and to give to them a foundation in metaphysics. To the third belong Agrippa, Paracelsus, Van Helmont, Cardan, and Robert Fludd, who advanced experimental knowledge by alchemistic researches. Most of these precursors of a new philosophical era were remarkable for their passionate and adventurous characters and their profound enthusiasm for the wonders and secrets of nature.—Modern philosophy is related to that of the middle ages as the Greek philosophy was to that of the Orient. The oriental abstract divinities of nature-worship were succeeded in Greece by the culture of individual humanity, and the fantastic conceptions of mediæval metaphysics were finally supplanted by a vigorous observation of mental processes. Modern philosophy begins with doubt, doubt so complete that nothing remains certain but the doubt itself or the energy of conscious thought. Two systems result, empiricism and idealism, according as the objective world or the thinking subject, experience or consciousness, be advanced as the test of certainty. Bacon and Descartes stand at the head of these systems, the development of which in a double line was the task of philosophy till the time of Kant. Francis Bacon, the greatest philosopher of England, holds the same relation to empiricism that Descartes holds to dogmatic idealism and Kant to the developments of the critical school. In an age of physical discovery, he proclaimed that the intellectual world like the material world should be advanced beyond its former boundaries, and that discovery, by which alone knowledge is increased, should be reduced to a method instead of being left to chance. This method is induction, the key of natural philosophy, which from a comparison of similar instances ascertains the essential conditions of phenomena, and thus derives axioms from experiments. He treated human knowledge not as a science, but as an art, whose object is to extend and establish the dominion of man by the application of physical forces to human purposes. There is no such application without discovery, no discovery without philosophy or an acquaintance with the laws of things, no philosophy without natural science, no natural science without an interpretation of nature; and this can be accomplished only according to the measure of our experience. Nature, he maintained, had previously been anticipated instead of interpreted; conceptions and judgments had preceded actual experience; and science had, therefore, remained occupied with sterile speculations. These anticipations of the mind he names idols, the *ignes fatui* of science, which should for ever be discarded. He thus substituted nature and observation for ideas and logic; made utility instead of theory the object of research; opposed efficient to final causes, and individual things to generic notions; and denied every thing that would render an interpretation of nature teleological, idealistic, or abstract. Throughout his writings, experience is taken for granted; the first question of all philosophy as to how we know, and whether we can know any thing, was not asked by him. He gave a new direction to thought, but he neither created nor aimed after a definite philosophical system. The empiricism which he founded was heightened in its sensualistic and nominalistic tendencies as it logically advanced, and at last resolved itself into scepticism. According to him, all the sciences, even morals, politics, and religion, were to be founded on natural science, which was thus made the basis of the whole moral world. The development of this view, the derivation of moral and civil order from the natural state of man, was the task of Hobbes, the politician of the Baconian philosophy. To gather discovery from experience was the goal of Bacon. Locke began with inquiry as to the nature of experience, and how it can be attained by the human mind. The problem of knowledge was thus raised by him. Bacon had affirmed that to think correctly we must first get rid of all preconceived notions; and Locke compared the human mind prior to experience to a *tabula rasa*, perfectly void of ideas. From original emptiness nothing can proceed, and human culture therefore arises from external influences. We perceive outward objects, according to Locke, by sensation, and the consequent action of our own mind by reflection. No idea is possible unto us except through these two sources. We can therefore perceive only the outward qualities, never the intrinsic nature or substance of things, and can affirm the objectivity only of the primary qualities of bodies, as form, number, hardness, and softness, and of the causal connection of phenomena. Though not always logically consistent, his empiricism was rigidly carried out by his successors, and both parts of the residue of human knowledge which he had aimed to secure were, one after the other, abandoned. Berkeley denied the primary qualities, and Hume the principle of causality. Though the philosophy of Berkeley bears the name of idealism, it belongs to the family of sensationalism, and has no resemblance to Platonic speculations. He agreed with his predecessors that we perceive not things in themselves, but only their copies in the mind; but he differed from them by affirming that there are no real originals behind the copies, that all seemingly objective qualities are mental phenomena. Nothing exists but our perceptions or ideas, and thus nature is resolved into a creature of the human mind, and all human knowledge into an empirical self-knowledge. He gave a religious character to his theory, and exhibited in one respect an affinity with Malebranche, by affirming that the Deity originates our perceptions, which are the data to lead us to Him. The negative tendency of English philosophy culminated in Hume. He agreed with Bacon that all our knowledge is experimental; with Locke, that all experience is sensational; and with Berkeley, that sensuous perceptions imply no objective reality. The relation between objects is as unreal as the objects themselves, since the idea of causality is founded on a belief that a certain antecedent has a certain consequent, this belief on a feeling, this feeling on a habit, which is itself nothing but an oft-repeated experience. Thus even within the region of phenomena to which knowledge is limited, there is no perfect certainty, but only habit or probability. Experience, which Bacon had presupposed and accepted as the instrument of philosophy, is thus brought into the foreground as its problematic object. The effort to explain it introduced a new epoch in speculation, when philosophy passed from dogmatism to criticism, and sought in the transcendental or pure faculties of the human mind the powers which constitute the essence of humanity, and which precede and legitimate experience.—The philosophy of Descartes begins with methodical doubt, to which only one thing remained *certain*, viz., the certainty of thought. No one before him had so distinctly separated the human consciousness from matter, making them independent of and foreign to each other. He rendered the service of conquering nature, so that it remained a problem of thought, but was no longer a power in the mind. The basis of his system is the dualism and antagonism of spirit and matter, of subject and object. The *Cogito, ergo sum* forms a subjective dogmatic circle, around which lies the objective realm of phenomena. These two finite substances constitute the actual world. They are opposed, and mutually exclude each other, and no direct union of them is possible. Yet man is the synthesis of the two, and knowledge is the penetration of thought into nature. Only as the spiritual and natural combine can human life be conceived of. To explain the problem at once of this antagonism and this union, Descartes introduces the absolute substance or God as the copula between spirit and matter. Our idea of an infinite substance, a perfect being, could not be derived from finite thought; it therefore implies and represents an external existence; it is a divine datum in us, an innate idea, a mark left by God upon his work, like the monogram of an artist upon his production. With this idea the mind ceases to be certain of itself exclusively, and gains the possibility and principle of objective knowledge. The monologue of subjectivity terminates when the sun of the infinite rises on our thought and illumines the universe. By the consideration of the divine attributes we determine the truth of outward things. The test of certainty concerning objects is that our ideas of them be clear and distinct, because such ideas are innate, implanted by God. Nothing is true in nature which may not be distinctly grasped by thought. The theories developed by Descartes in physics have been overthrown by the progress of science. His metaphysical system was ineffectively opposed by the Epicureanism of Gassendi, and was modified by Geulincx and Malebranche. Both the latter admitted the antagonism of the two substances, and the impossibility of their union. Yet it is an indisputable though inexplicable fact that they are determined by each other, that the will moves the body and sensation affects the mind. This fact is, according to Geulincx, the miraculous work of God, who employs the will and the object of sensation as occasions of his own agency. The Deity is the actual cause of all mental and physical phenomena. His theory therefore bears the name of occasionalism. Malebranche also conceived that the antagonism is overcome only in God, but omitting the notion of miracle he tended to blend the infinite and the finite spirit, and regarded all human knowledge as a divine act. We see all things only in the Deity. The three substances which had formed eccentric spheres in the Cartesian system became concentric in that of Malebranche. A more important successor of Descartes was Spinoza. He remarked that in Cartesianism the absolute substance always remained in the background, and had been introduced as a theological resource, a *deus ex machina*, to solve a difficulty that presented itself in philosophy. The two finite substances were the actual heroes in the drama of the world. The scheme of Spinoza reduces the three Cartesian substances to unity, to one infinite original substance, the ground of all things, that excludes from itself all negation or determination, and is named God or nature. To this belong an infinite number of attributes, of which two only are known to us, thought and extension. Modes are the changing forms of these attributes. To regard finite things as distinct individualities is the mistake of our imagination; the reason contemplates them only as the *natura naturata* in which the *natura naturans* is revealed. This scheme is ontological, developed from *a priori* axioms, and is the most elaborate of all systems of pantheism. While Spinoza escaped from the dualism of Descartes by affirming that there is but one substance, of which all things are modes, Leibnitz increased to infinitude the number of substances. The universe is an aggregate of intelligent, self-active, immaterial points, which he calls monads, and which combine as elements to form every thing. They are unlike each other, but each follows the law of its own being, and cannot be affected by any thing external to itself. The soul therefore cannot work upon the body, and the relation between them is due to a preëstablished harmony, God having so constituted them in the beginning that they operate in perfect concord though independently. Our mental ideas proceed *pari passu* with external realities, though they have no connection with each other. God is the *monas monadum*, the sufficient cause of the universe, which is the best one of an infinitude of possible worlds that were contemplated by the divine intelligence. The theories of Leibnitz were systematized by Wolf, and from his time to Kant German philosophy assumed no new standpoint. In psychology Leibnitz prepared for Kant by seeking the distinction between necessary and contingent truths, maintaining that, though no ideas are innate, the mind by its own energies, apart from experience, generates necessary truths according to innate principles. The speculations of Jonathan Edwards, the greatest metaphysician of America, chiefly on the theological and ethical bearings of philosophy, belong to the school of Descartes and Leibnitz.—Meantime the empirical tendency of Bacon and Locke was developed in France and opposed in Scotland. Condillac reduced Locke's two sources of knowledge to one, regarded all ideas as transformed sensations, and made metaphysics, as Destutt de Tracy admits, a branch of zoology. His system triumphed over Cartesianism not so much by favoring observation of facts instead of deduction from ideas as by linking itself with social and ecclesiastical reforms, occupying itself with natural and public law, and encouraging abstract justice and right in political organizations. Helvetius, the moralist of sensationalism, esteemed self-love the only motive of human action. The tendency culminated in the reckless materialism and atheism of La Mettrie and D'Holbach, who deemed every thing spiritual an illusion and physical pleasure the only worthy object. In Scotland Reid undertook the refutation of Berkeley and Hume, by denying the hypothesis of representative ideas and affirming the authority of common sense. His negation at least called attention to abuses of language, and overthrew any meaning of idea in the sense of an intermediate image between the object and the mind in the act of perception. His affirmation has remained with modifications the peculiarity of the Scotch school. By common sense he means a kind of intellectual instinct. We believe by the very constitution of the mind in connection with every sensation in the existence of some external object as immediately and certainly as in our own existence. The sensation implies the object, and we require no proof to justify the testimony of our faculties. He applied the Baconian method to the mind, and by his analysis of the phenomena of perception gave a new prominence to psychology in metaphysical researches. In connection with empirical truths he maintained the existence of necessary and spontaneous judgments, laws of mind, instinctive principles, *a priori* intuitions, truths of common sense, which are not derived from experience, and which are the data of speculative philosophy. A more complete analysis of these fundamental laws or constituent elements of human reason was made by Dugald Stewart, who illustrated the system with peculiar beauty of style; but neither he nor his successor Dr. Brown removed the characteristic difficulty of the school to determine what mental phenomena are native and *a priori* and what adventitious and contingent. The Scotch philosophy was reproduced in America, with some modifications, by Prof. Upham.—Thus modern philosophy had culminated in the formal rationalism of Wolf in Germany, the materialism and scepticism of Condillac and Hume in England and France, and the protest in the name of ill-defined principles of common sense in Scotland. Kant now discovered the critical point of view, and took the same position with reference to experience and knowledge that had been taken by Bacon with reference to nature. Analyzing the phenomena of experience, he sought the powers or faculties which constitute it, the conditions which as necessary functions precede it, and which he called transcendental. He did not, like the followers of Descartes, presuppose knowledge in innate ideas, nor like the sensationalists presuppose experience in mental impressions, but aimed after the knowledge-forming faculties which precede all knowledge, and which make physics, mathematics, and metaphysics possible. The results of his critical examination were: that our intellectual nature is the product of 3 factors, sense, understanding, and reason; that all the material of our knowledge is furnished through sense in a formless mass; that the understanding reduces this material to shape and distinctness, to the unity of a notion, in accordance with its 12 categories, the matter of experience thus filling the form of conception; and that the reason, which rises above finite notions, and has no reference to objects, finds the unconditioned principles, the pure ideas, for the conditioned knowledge of the understanding. Now, as the objective world is known to us only in the form into which it is transmuted by the categories of the understanding, as our knowledge of things is thus purely subjective, as even the ideas of the reason are only our own modes of thinking, therefore ontology is scientifically impossible. Kant saves himself from pure subjective idealism only by retreat to his practical philosophy. Consciousness reveals to us the autonomy of the will, expressing itself in the supremacy of conscience, which is the categorical imperative. This moral nature implies freedom as its necessary condition; the existence of a God, as otherwise there would be a law without a law-giver or judge; and the immortality of the soul, for the completion of our moral existence. The practical reason affirms the reality of these things, not as theoretical dogmas, but as the necessary postulates and premises of our moral constitution and action. They lie beyond the bounds of actual science, but are the undemonstrable certainties of a rational faith. The ablest opponent of the Kantian philosophy, Jacobi, took the standpoint of faith in opposition to that of criticism in order to give theoretic certainty to the postulates of the practical reason. The absolute, which is unattainable by the reason, may be grasped by feeling, the *salto mortale* of the mind, which gives immediate knowledge requiring no other evidence. In his later writings he identified faith or intuition with the Kantian reason, claiming for the latter the faculty of objective knowledge. Fichte, the direct successor of Kant, introduced the philosophy of the absolute, proposing a single principle in opposition to the Kantian dualism of mind and the postulated objective world. All that is immediately true to us is our sensations, perceptions, and ideas, the phenomena of consciousness; and he therefore made *self* or the Ego the absolute principle, which by its own development becomes the universe, nature, and man, and appears as a spectacle unto itself. The individual consciousness is the manifestation of this absolute Ego, the phenomenal shadow of an ultimate reality, which is our essential self. The world also is but the sensized material of our practical life, the means by which we place before us, as object, the aim and end of our existence. Nothing exists but a certain subjective activity, of which the universe is the apparent reflex, and God the ideal or law. Thus Fichte consummated the subjective idealistic tendency. "We know nothing," says he, "but by consciousness; consciousness is but a phenomenon; the images present to us are formed of images and by images; all reality is changed into a wondrous dream, without a life to dream of and without a mind to dream, a dream composed of a dream of itself. Perception is a dream; thought is the dream of that dream." The speculative result is thus nihilism, but by his practical philosophy he postulated on the authority of faith the existence of God as the moral order of the world, and defined duty as the fulfilment of individual destiny, and destiny as the realization by humanity of the absolute Ego, of the ideal standard of reason. In his later system he approached the principle of identity, regarding the world and consciousness as both alike the image and impress of the divine life. This principle was fully developed by Schelling, who proposed an infinite, self-existent, self-unfolding mind, from which every thing else is developed, as the only absolute reality, forming of itself the real essence of the universe. Spirit and matter are in it identical. According to Fichte, the object is created by the subject; according to Schelling, both object and subject are emanations of the absolute, which works by a blind impulse in nature, comes to self-consciousness in mind, and is evolved by the necessary law or rhythm of its being through the whole material and mental universe. Every mind is a reflection and exemplar of the infinite mind; and therefore by gazing inwardly on our own mental processes we may learn the principle or process of the divine development. The organ of philosophy is an ecstatic intellectual intuition, superior to the laws of consciousness, which immediately knows the absolute, and to which subject and object are indifferent. By this intuition the mind becomes absolute and identical with the Deity; the process of thinking is therefore the same as that of creating; thought and being are one; and our logical deductions are the formulas of development in all the forms and regions of creation. The world is thus autonomic, presenting only individualizations of a common principle. The subjective idealism of Fichte, and the objective idealism of Schelling, were succeeded by the absolute idealism of Hegel. The absolute idea, logically and by its inherent energy developing itself through the forms of creation, and completing the circle of its activity in the rational self-consciousness of man, is the fundamental conception of Hegelianism. Logic is the basis of the system, the law of ideal evolution, the *a priori* science of the universe, the very substance of being. The world is visible logic. His absolute is neither the universal substance of Spinoza, nor the transcendental self of Fichte, nor the universal mind of Schelling, but it is the dialectical process or law of development. Nature is the idea externalizing itself, the transformation of abstractions into realities, and its aim is to raise itself to self-consciousness. "It is a dumb intelligence striving to articulate." Spirit is the idea having emancipated itself from nature, and waked to consciousness in man; and it is by this awaking that the universe, as such, is produced, since thought and existence are identical. The perfection of spirit is in revealed religion or absolute philosophy, in which the conscious idea attains to universality, and reproduces from itself the whole natural and intellectual universe. The atomic metaphysics of Herbart, the mysticism of Baader, the scheme of Trendelenburg, founded on the idea of individualism and personal destiny, and the pantheism of Kuno Fischer, are the more important of the minor German systems. The transcendental philosophy, unable to attain to the absolute through the consciousness, was obliged in each of its forms to assume the existence of a principle superior to consciousness. Some strict psychologists have therefore charged it with resting upon and describing purely imaginary and impossible mental operations. Its earlier results were made known and discussed in England by Coleridge and in America by James Marsh.—The reaction against sensationalism in France, which under the name of ideology reached its last results in the physiological psychology of Cabanis, the ethics of Volney, and the logical deductions of Destutt de Tracy, began with the admission by Laromiguière of an active as well as passive element in the mind in perception, with the adoption of the Scotch philosophy by Royer-Collard, and with the stress laid on the power of the will by Maine de Biran. Cousin succeeded with the system of eclecticism. The results of all philosophical research, according to him, had been either sensationalism, idealism, scepticism, or mysticism, each of which contains a truth in excess. The eclectic method proposed to disengage the truth from each of them, and to combine these elements in a system which should be a harmonious expression of complete truth. The capital questions had been profoundly and repeatedly explored; all that remained to be done was to conciliate the results. The criterion of truth is the impersonal and divine reason, in which all rational beings share, and which is the source and test of absolute ideas. Jouffroy and Damiron were the principal followers of Cousin. Meantime an ecclesiastical and traditional tendency in philosophy was illustrated by De Maistre, Lamennais, and Bonald, whose aim was to substitute faith for knowledge and authority for investigation. Man as an individual, according to Lamennais, has no criterion of truth; but the universal beliefs of the whole race, the authoritative traditions of all time, are to be accepted as a divine revelation. He sought, therefore, to prove that the Christian religion, either in its purity or in offshoots and counterfeits, had been universally recognized by the faith of mankind, and constitutes the only attainable system of truth. His later writings contain an ontological system akin to Neo-Platonism. Another tendency appeared in the socialistic mystics St. Simon, Fourier, and Pierre Leroux. St. Simon aimed to extinguish individualism in social order, and maintained that true philosophy should be sought historically, that it existed in minds rather than in mind. From history and not psychology he derived his law of development, which was to be at once a system of religion, philosophy, and government. Fourier excelled in the analysis of the passions, which alone, according to him, constitute the real man, and inferred that the Newtonian principle of attraction was applicable to them, and might be made to harmonize social life. By the principle of universal analogy he proposed theosophic doctrines of cosmogony and destiny beyond the possible scope of induction. Leroux regarded individual man as a mere abstraction, the whole of humanity as the only real existence, tradition as the source and organic social life as the object of philosophy.—A peculiar philosophical school has flourished in Italy during the present century, the representatives of which are Rosmini, Mamiani, and Gioberti. According to Rosmini, the starting point of all philosophical investigation, the apodictical element of all thought, the primitive and necessary intuition, is the idea of possible being. This idea, the first psychological fact, being associated with a perception of sense, the first ontological fact, loses its indeterminate character, and is transformed into knowledge. The former belongs to the domain of philosophy, the latter to that of physiology. The notion of time is the synthesis of the idea of possible being with that of the contingent duration of phenomena, and the notions of space, cause, and substance are similarly formed. Instead of seeking, like modern psychologists, his point of departure in the individual consciousness, he introduces an *a priori* element, a hypothesis anterior to all mental experience, as the abstract condition and foundation of thought, which has only to be developed and applied in connection with sensation to constitute all intellectual acts and a system of the universe. The aim of Mamiani was to demonstrate a dogmatic philosophy, to prove the objective reality of ideas. Combining the *a priori* and the empirical methods, he made the criterion of truth an immediate intuition, which involves the assent of all the faculties. His principal merit is in the methodical arrangement of principles borrowed from all schools, and in directing attention to the natural laws which govern the applications of human thought. His character as a philosopher appears in his aspiration for the time "when, in the heart and mind, instinct, religion, and science shall become one and the same thing, when instinct shall be rational, philosophy profoundly religious, and religion perfect wisdom." Gioberti and Rosmini have been characterized as the Plato and Aristotle of modern Italy. The former developed what has been called a "philosophy militant," designed to reconstruct all modern science and society. Psychology he pronounces the essence of philosophical and religious heterodoxy, and the attempt to develop the universal from the contingent totally fruitless. He proclaims the intuition, not like Rosmini of possible being, but of real being, of the active Deity, as the absolute source of existence, and proposes the formula *L'ente crea esistenze* as the supreme formula by which every thing is explained. Real existence in the act of creation is the goal of thought alike in metaphysics, physics, ethics, æsthetics, and politics. Philosophy is founded on revelation and perpetuated by the church, which is the depositary of truth, and which creates civilization. The Italian school is remarkable for its *a priori* method and its respect for ecclesiastical and national tradition.—More influential at the present time than any other system since that of Hegel are the philosophy of the conditioned of Sir William Hamilton and the positive science of Auguste Comte. The former adheres to the traditions of the Scotch school by affirming that our consciousness in the act of perception makes us immediately cognizant of something external and extended. Our knowledge is conditioned by our faculties: we have no faculty for comprehending the infinite and absolute; and all human philosophy, therefore, treats only of the relative and phenomenal. The whole matter of the absolute is declared to be *nihil cogitabile*, and is transferred from the province of philosophy to that of religion, from reason to faith. We can know only finite phenomena, but faith assures us of the unconditioned, though we cannot conceive it. That our faculties are inadequate, that several of the fundamental laws of thought are results of the imbecility of the mind and not positive affirmations of intelligence, is demonstrable; but faith forbids us to admit that the mind, though weak, is false. The positivism of Comte develops the negative, and denies the positive side of this composite system of science and faith. It affirms that we can know nothing but phenomena, their resemblances, coexistences, and successions; that psychology, the pretended self-contemplation of the mind, is an utter illusion, and objective facts alone can be observed; that the endeavor to penetrate into ontology is hopeless, the knowledge of essences and causes being beyond our possible scope. There are three eras of human development. In the first, theological hypotheses were proposed to explain phenomena; in the second, metaphysical hypotheses; but in the third the futility of both is perceived, and mankind, ceasing to make ontological inquiries, accepts all facts as mere phenomena, and classifies them by the relations of succession and similitude which they bear to each other. The perfection of positive science would be a complete view of all phenomena in their relations. This system is represented with modifications, in England, by John Stuart Mill, G. H. Lewes, and Herbert Spencer.—The principal general histories of philosophy are: Brucker, *Historia Critica Philosophiæ* (5 vols., Leipsic, 1742–'4); Tiedemann, *Geist der speculativen Philosophie* (6 vols., Marburg, 1791–'7); Tennemann, *Geschichte der Philosophie* (11 vols., Leipsic, 1798–1819; an English translation of an abridged edition was made by Arthur Johnson, Oxford, 1832, and revised by J. D. Morell, London, 1852); Windischmann, *Die Philosophie im Fortgang der Weltgeschichte* (4 vols., Bonn, 1827–'32); Hegel, *Geschichte der Philosophie* (3 vols., Berlin, 1833–'6); Ritter, *Geschichte der Philosophie* (12 vols., Hamburg, 1836–'53; partly translated by Morrison, 4 vols., London, 1838); Schwegler, *Geschichte der Philosophie* (Stuttgart, 1848; translated by Seelye, New York, 1856); De Gérando, *Histoire comparée des systèmes de philosophie* (2d ed., 4 vols., Paris, 1822–'3); Cousin, *Cours de philosophie morale* (1840–'41); Enfield, "History of Philosophy" (2 vols., London, 1791); and Lewes, "Biographical History of Philosophy" (London and New York, 1857). The best special history of occidental philosophy is by Röth, *Geschichte unserer abendländischen Philosophie* (2 vols., Mannheim, 1846–'58). The principal special accounts of ancient philosophy are: Zeller, *Die Philosophie der Griechen* (Tübingen, 1844); Matter, *Histoire de l'école d'Alexandrie* (Paris, 1840); Jules Simon, *Histoire de l'école d'Alexandrie* (2 vols., Paris, 1845); Vacherot, *Histoire critique de l'école d'Alexandrie* (3 vols., Paris, 1846–'51); and W. A. Butler, "Lectures on the History of Ancient Philosophy," edited by Thompson (2 vols., Cambridge, 1856). Special works on the scholastic philosophy are: Rousselot, *Études sur la philosophie dans le moyen âge* (3 vols., Paris, 1840–'42); Caraman, *Histoire des révolutions de la philosophie en France* (3 vols., Paris, 1847); and Hauréau, *Histoire de la philosophie scolastique* (2 vols., Paris, 1850). The principal histories of modern philosophy are: Kuno Fischer, *Geschichte der neuern Philosophie* (5 vols., Mannheim, 1854–'70); K. L. Michelet, *Geschichte der letzten Systeme der Philosophie in Deutschland* (2 vols., Berlin, 1837–'8); Chalybäus, *Entwickelungsgeschichte der Philosophie* (translated into English, Edinburgh, 1854); Rémusat, *De la philosophie Allemande* (Paris, 1846); Willm, *Histoire de la philosophie Allemande depuis Kant jusqu'à Hegel* (4 vols., Paris, 1846–'9); Debrit, *Histoire des doctrines philosophiques dans l'Italie contemporaine* (Paris, 1859); Taine, *Les philosophes Français au XIXe siècle* (Paris, 1860); and Morell, "An Historical and Critical View of the Speculative Philosophy of Europe in the 19th Century" (2d ed., 2 vols., London, 1857; republished in New York). The most valuable cyclopædias of philosophy are: Krug, *Encyclopädisch-philosophisches Lexikon* (5 vols., Leipsic, 1827–'9); and Franck, *Dictionnaire des sciences philosophiques* (6 vols., Paris, 1844–'52). The principal periodical devoted entirely to metaphysics is the *Zeitschrift für Philosophie und speculative Theologie*, which has been published in Germany since 1837.

PHILOSOPHY, MORAL. See MORAL PHILOSOPHY.

PHIPPS, CONSTANTINE JOHN. See MULGRAVE, BARON.

PHIPS, or PHIPPS, SIR WILLIAM, governor of Massachusetts, born in Woolwich, Maine, Feb. 2, 1651, died in London, Feb. 18, 1695. He was one of 26 children, was at first employed as a shepherd, and at the age of 18 bound himself to a ship carpenter, and subsequently went into business on his own account, although his early education had been so neglected that he was unable to read or write. These defects, however, he soon repaired to some extent. A few years after coming of age, he went to England in order to procure means for an expedition to recover a Spanish vessel, loaded with treasures, which had been wrecked near the Bahamas. With a national vessel furnished him by the admiralty he made the expedition, but did not succeed in his search; but a second attempt, in which the means were supplied by the duke of Albemarle, was crowned with success. He recovered from the wreck treasure to the amount of £300,000, of which £16,000 was given him as his share, and in addition he received the honor of knighthood, and was appointed high sheriff of New England. In this capacity he returned to his native country, and remained for some time in Boston; but disagreeing with some other officers, he went back to England. In 1690 he commanded the fleet which captured Port Royal, and in the same year a much larger one sent against Quebec, which failed of success. He arrived in Boston in November, and was made a magistrate of the colony, but soon departed to England in order to induce the government to send another expedition to Canada. At this time the agents of Massachusetts were endeavoring to obtain from King William the restoration of the old charter; but not succeeding in this, a new one called the province charter was granted them in 1692. Phips was a member of the North church of Boston, of which Cotton Mather was pastor, and was noted for his zeal for Puritanism; and out of deference to the wishes of Increase Mather, the agent of Massachusetts in England, he was appointed captain-general and governor-in-chief of the province, and arrived in Boston May 14, 1692. In 1694 he was summoned to England to answer complaints which had been brought against him; but while there, and when it seemed that the difficulties would be settled in his favor, he suddenly died. He was a lover of his country, and aimed to discharge the duties of his office justly; but the violence of his temper led him constantly to commit acts which weakened his influence. He was, says Bancroft, "of a dull intellect, headstrong, and with a reason so feeble, that in politics he knew nothing of general principles, in religion was the victim to superstition." He is strongly eulogized by Cotton Mather, with whom he coöperated in the witchcraft delusion. (See "Life of Sir William Phips," by Francis Bowen, in Sparks's "American Biography," vol. vii.)

PHLEBITIS (Gr. φλεψ, φλεβος, a vein), inflammation of the veins. Phlebitis is one of the numerous diseases which modern observation has added to the domain of medicine. First noticed by John Hunter in 1784, numerous isolated cases were soon after published, and in the early part of the 19th century the disease was fully illustrated by the labors of the French pathologists. Phlebitis is of two kinds, adhesive and suppurative. Adhesive phlebitis is a local disease, occasioned generally by some mechanical injury done to the coats of a vein, or by some source of local irritation in its neighborhood. It is marked by a dull pain in the part, by swelling, hardness, and tenderness of the affected vein, and, when this is a main venous trunk, by œdema of the parts whose blood is returned by it; phlegmasia dolens is thus properly a phlebitis. The effect of adhesive phlebitis is to determine the formation of fibrinous clots which adhere more or less strongly to the walls of the vein, blocking up its caliber. After a time the adhesions become loosened, the clots are absorbed, and the circulation through the vein is restored. The disease, except where the blocking up of a main trunk may cause embarrassment to the circulation, is not a serious one; rest and perhaps the application of a few leeches along the course of the affected vein are all that is necessary for its cure.—In suppurative phlebitis the local symptoms are often so little marked as to attract no attention, while the general symptoms are of the gravest character. The latter ordinarily commence by a marked chill, and this is repeated at irregular intervals, in some cases several times a day, throughout the disease. The chills are followed by heat of skin and great frequency of pulse, and these terminate generally in a profuse sweat. The vital powers are commonly early depressed, and the patient complains of great weakness. The appetite is totally lost, the tongue is red and dry, sometimes sordes of the teeth and mouth are present, and sometimes there is copious and offensive diarrhœa. In the course of the disease abscesses may make their appearance at different points in the subcutaneous cellular tissue, or one or more of the joints may become distended with pus. On examination after death pus is often found in the veins, with numerous (multiple) abscesses in the parenchyma of the lungs or liver. The disease is almost necessarily fatal. and medicine can do little to retard its progress; to support the system of the patient by appropriate food, by quinine and stimulants, seems the principal indication.

PHLEBOTOMY. See Bloodletting.

PHLEGMASIA DOLENS, or Phlegmasia Alba Dolens, an œdematous swelling of one or both of the lower extremities, commonly called milk leg, attended with pain, and occurring soon after childbirth. The disease was first noticed at the commencement of the 17th century. It was for a long time attributed to deposits of milk in the affected leg, and afterward to obstruction of the lymphatics, &c. In 1823 Dr. Davis of London and Dr. Bouilland of Paris both published post-mortem examinations of cases of phlegmasia dolens, in which the femoral vein in the affected extremity was found inflamed and obstructed by fibrinous deposits. A few years later Dr. Robert Lee traced the inflammation from the femoral to the uterine veins. It would seem, then, well established that the disease is simply an adhesive phlebitis, having its origin generally in the uterine veins. The attack comes on commonly within 2 or 3 weeks after delivery, with pain in the lower part of the pelvis, extending rapidly below Poupart's ligament in the course of the femoral vein, or perhaps commencing in the calf of the leg. The pain, which is commonly attributed to rheumatism, is soon followed by swelling. This may be moderate in amount and confined to the leg, or it may be enormous and involve the whole extremity. When the swelling is great, the limb is white, hard, hot, and does not pit on pressure. The inflamed vein can be commonly traced below the groin as a hard, painful cord. There is fever, loss of appetite, and sleeplessness. The disease is ordinarily without danger, the swelling gradually subsiding after a time, though more or less œdema is sometimes permanently left. Rest, the application of a few leeches along the course of the inflamed vein, and an unirritating diet are all that is necessary for the cure of the disease.

PHLIASIA, a division of the Peloponnesus, bounded N. by Sicyonia, E. by Cleonæ, S. by Argolis, and W. by Arcadia. It consists of a small valley, 900 feet above the sea level, and is enclosed by mountains. The river Asopus flows through the middle of the plain. In antiquity this territory was renowned for its wine. The only place of importance was the city of Phlius, which was a Doric state, and usually governed by an aristocracy, although once subject to the tyrant Leon, a contemporary of Pythagoras. It sent 200 soldiers to Thermopplæ and 1,000 to Platæa, and during the Peloponnesian war was the faithful ally of Sparta. Afterward a division arose in the city, and the friends of the Lacedæmonians were banished; but in 393 B. C. the Phliasians received from Iphicrates so severe a defeat that they were forced to admit a Lacedæmonian garrison for their defence, which however did not restore the exiles. In 380 and 379 it sustained from Agesilaus, at the head of a Spartan army, a siege of one year and 6 months. Having surrendered, it remained faithful to Sparta during the Theban war, was governed by tyrants after the death of Alexander, and subsequently joined the Achæan league. Phlius was the birthplace of Pratinas, the inventor of the satyric drama. In the present kingdom of Greece Phliasia forms part of the nomarchy of Achaia and Elis.

PHLOGISTON. See CHEMISTRY, vol. v. p. 24.

PHOCION, an Athenian general, born about 402 B. C., put to death in 317. The son of a pestle maker, he studied under Plato and Xenocrates, and first distinguished himself in the naval victory gained at Naxos in 376 by the Athenians under Chabrias over the Lacedæmonians, but for many years after was not prominent in public life. Sent into Eubœa about 350 at the head of a small force to assist Plutarch, tyrant of Eretria, he was betrayed by the latter, and for a time was exposed to imminent danger; but he finally gained a complete victory at Tamynæ over the party of Philip. In 340 he was despatched with a fleet to the relief of Byzantium, then closely besieged by the Macedonians, and was enabled to force Philip to retire from the Chersonesus. Although so successful in war, Phocion was always an advocate of the temporizing policy of the peace party, and thus stood in direct opposition to Demosthenes. When Thebes, on the reported death of Alexander, declared itself independent of Macedon, the Athenians were prevented by his influence from giving them assistance, and occupying the pass of Thermopylæ. A little later he advised compliance with the demand of Alexander that the 10 leaders of the anti-Macedonian party should be given up, which proposition was indignantly rejected; but he nevertheless headed the second embassy, by the agency of which the demand was waived. After the death of Alexander, Phocion attempted to discourage the effort of the Greeks to free themselves from the Macedonian yoke. When the effort proved unsuccessful, he was one of the envoys sent to Antipater, and only succeeded in concluding a treaty on the hard conditions that the Athenians should pay a sum equal to the whole cost of the war, should surrender the anti-Macedonian orators, should receive a Macedonian garrison at Munychia, and should abandon their democratic constitution, and disfranchise their poorer citizens. He was now at the head of the Macedonian party in Athens, and while in that position was suspected of complicity with Nicanor, the general of Cassander, commander of the Macedonian garrison, and subsequently with Alexander, son of Polysperchon, who was besieging Nicanor. On the return of the Athenian exiles, and the restoration of the democratic government, he was compelled to flee to Polysperchon in Phocis, by whom he was sent back to Athens for trial. With 4 others he was condemned to drink the hemlock. He charged his son not to hold evil memory of the Athenians, and it is said was called upon to pay for his own execution, inasmuch as the poison having been exhausted the gaoler refused to procure any more without compensation; whereupon Phocion, borrowing 12 drachmæ, remarked that it was very hard a man could not even die gratis at Athens. Shortly after Cassander obtained possession of the city, the oligarchical party regained power, and celebrated Phocion's funeral obsequies at the public expense, erected a statue in his honor, and punished his accusers. Phocion was a man of great courage, a good general, and above all free from the least suspicion of personal corruption. By his reputation among the Athenians for this last quality he acquired in great measure his influence with the people, so that he was elected the unparalleled number of 45 times to the office of general of the city, without having solicited the position or having been present at the choice. Although not a professed orator, his brief and powerful speeches and his sarcastic manner exerted so great an influence, that Demosthenes, on seeing him rise, once said: "Here comes the cleaver of my harangues." In outward manner he was severe and surly, although said to be kind-hearted. He had a contempt for the people which he never affected to hide; and once, when tumultuously applauded in a public assembly, he turned round to a friend and inquired: "What folly have I uttered, that these men applaud me?" His probity was never shaken by the tempting offers of money and favor held out by Philip, and afterward by Alexander, who entertained for him a high regard. But he did gratuitously for the Macedonians what others did for pay, and lent the influence of his undoubted patriotism to that temporizing policy which ultimately involved Athens and the other Grecian states in a common ruin.

PHOCIS, a country of central Greece, bounded N. by the Locri Epicnemidii and the Locri Opuntii, E. by Bœotia, S. by the Corinthian gulf, and W. by Doris and the Locri Ozolæ. At one time it also comprehended a port on the Eubœan sea, called Daphnus. The principal city of Phocis was Delphi. The next in importance was Elatea, on the left bank of the Cephissus, commanding the road leading from the north of Greece to Bœotia and Attica. Beside these, there were several other cities of importance, such as Cirrha, the port of Delphi; Anticyra or Anticirrha, renowned for its preparations of hellebore; and Abæ, distinguished for its ancient oracle of Apollo. The largest river is the Cephissus, which flows through the northern portion of the country, and falls into Lake Copais in Bœotia. The country is exceedingly mountainous. The Parnassus range extends over the greater portion of it, the southern branch of the chain called Cirphis touching the Corinthian gulf between Cirrha and Anticyra. Below this range are several fertile valleys, of which the largest was the celebrated Crissæan plain. Between Parnassus and the Locrian mountains on the N. is the valley of the Cephissus, which embraces a few fertile though narrow plains. The chief importance of Phocis is due to the fact that the oracle of Delphi was within its boundaries. The Phocians proper, who inhabited both banks of the Cephissus, formed a confederation, which assembled at Daulis in a building called Phocicum. This confederation maintained its freedom, although frequently attacked by the Thessalians; and the latter, at the time of the invasion of Xerxes, led the Persian troops into Phocis, and destroyed 12 cities. Originally the temple of Delphi had been in their power, but they were early deprived of it by the Delphians, who held it till 450 B. C. It now came again into the hands of the Phocians, and both Lacedæmonian and Athenian forces marched into their territory, the one to attack, and the latter to defend. They held possession of the temple until the peace of Nicias (421), having been during the Peloponnesian war firm allies of the Athenians. But by the terms of that peace, the Delphians resumed their sovereignty over the temple, which remained in their hands until the sacred war. After the battle of Leuctra in 371, the Phocians came under the dominion of the Thebans, and remained in that condition until the death of Epaminondas, when they asserted their independence. For this the Thebans persuaded the amphictyons to enforce an old edict ordering the Phocians to pay a fine for having occupied a tract of land near Cirrha belonging to the temple of Apollo at Delphi. Their refusal gave rise to the sacred war, which lasted from 355 to 346 B. C., in which the Phocians maintained themselves by despoiling the temple, and were only reduced by the strategy of Philip of Macedon. A decree was hereupon issued by the amphictyons that the towns of Phocis, numbering 22, should be destroyed with the exception of Abæ, that the inhabitants should be scattered into villages, that no village should contain more than 50 dwellings, and that the inhabitants should repay to the temple the treasure they had taken, contributing each year 50 talents. The operations of the war which Philip afterward carried on against the Thebans and Athenians were principally in Phocis, and its people fought at the battle of Chæronea on the side of Greek independence. Phocis and Phthiotis together now form a nomarchy of the kingdom of Greece, their population amounting in 1856 to 91,944, and their capital being Lamia.

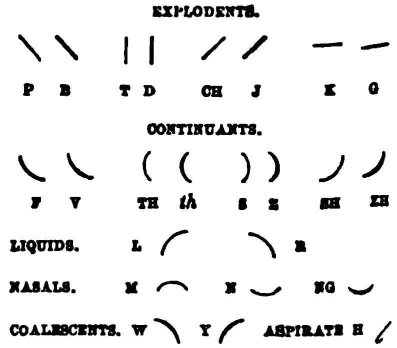
PHŒBUS. See Apollo.

PHŒNICIA (Gr. Φοινικη, from φοινιξ, a palm tree), the name given by the Greek and Roman writers to the narrow region which lies between the hills of Palestine and the mountains of Syria on the E. and the Mediterranean on the W. By the Phœnicians themselves their country was called Canaan. Its northern boundary in a political sense was near Aradus in lat. 34° 52′ N., and its southern near Joppa in lat. 32° 2′ N., and its length about 200 m. The breadth never in any part exceeded 12 m., and was generally much less. The total area therefore was less than 2,000 sq. m. From Aradus to Tripolis the coast forms a bay into which several rivers fall having a short course from the mountains. Tripolis, now called Tarablus, stands on a promontory ½ m. broad and extending a mile into the sea. A chain of 7 small islands running out to the N. W. protects its harbor from the prevalent winds. S. of Tripolis a low range of chalk hills borders so closely on the sea that there is no room for a road between them. Further S. they recede a little from the sea, and on a narrow strip stands Batroun, the ancient Botrys; and still further S., on a hill by the shore, stood the city called Byblus by the Greeks. A little S. of Byblus is the river Ibrim, the ancient Adonis, which was said to be annually changed into blood, and which still assumes in summer a red color derived perhaps from the ferruginous sands of the mountains from which it flows. A few miles further S. stood Berytus, now Beyroot, on the most projecting headland of the coast, with the mountain range of Lebanon in full sight across a plain of luxuriant fertility. Berytus, though not much celebrated in profane history, was one of the oldest of Phœnician towns. The plain in which it stood extends southward 10 m. to the mouth of the river Damour, the Tamyras of ancient geography, beyond which the hills again press closely on the sea for several miles. There, on the slope of a small promontory, is seen the site of Sidon, the oldest and one of the most famous of the cities of Phœnicia. The plain of Sidon is prolonged as far as Sarepta, the Zarephath of the Old Testament, 8 m. to the south. From Sarepta the plain again widens and continues as far as Tyre, with an average width of about 2 m.; near that city it widens to 5 m.; 8 m. S. of Tyre it terminates in the White promontory rising perpendicularly from the sea to the height of 300 feet. The road here, which in some places hangs over the water, was cut through the rock, it is said, by Alexander the Great. Originally it appears to have been ascended by steps, and was therefore called the Tyrian *climax*, or staircase. About 30 m. still further S. Acre or Acco, the Ptolemais of the Greeks, stands on the N. projection of a bay which is about 8 m. across and is terminated on the S. by the promontory of Carmel. A few miles southward is Dorce, anciently a town of considerable magnitude, next to which at no great distance the important city of Cæsarea was in later ages built by Herod the Great. At Jaffa, the ancient Joppa, 30 m. southward, the Phœnician territory terminated. The vicintry of the Nile affects the coast of Phœnicia even as far N. as Tyre and Sidon. The set of the currents carries regularly to the eastward the alluvial matter which the river pours into the sea, and deposits it on the coast, so that towns formerly maritime have become inland, and harbors which once received fleets of ships are now filled up. (For the climate and natural history of Phœnicia, see PALESTINE, and SYRIA.) —Though the Phœnicians appear to have dwelt on the sea coast of Syria at the earliest dawn of history, they always considered themselves as colonists and not as aborigines. Herodotus says they came from the Erythræan sea, that is, that part of the Indian ocean which washes the shores of Arabia and Persia, to the Mediterranean, "and having settled in the country which they now occupy, immediately undertook distant voyages; and, carrying cargoes both of Egyptian and Assyrian goods, visited, among other places, Argos." In the Scriptures they are always termed Canaanites, and are classed among the descendants of Ham. They were of darker complexion than the other Syrians, and the Greek writers frequently speak of them as Ethiopians. The most probable theory in regard to them is that ethnologically they were Arabs or connected with the Arabian family of mankind. Like the Arabs to this day on the shores of the Indian ocean, they were at once pirates and merchants. Kidnapping and barter were practised indifferently by the crews of their ships. Homer represents them as carrying off and selling for slaves those whom they could get into their power by force or fraud. But though Europe suffered from their piracy, it is certain that from their visits she received the rudiments of her civilization and imbibed a taste for the elegances of life. The use of alphabetical characters and also arithmetic has been clearly derived from Phœnicia by every ancient European nation. The choicest works of art known to the earlier Greeks came from Sidon; the produce of its looms furnished the costliest offering to the gods; and its trinkets adorned the persons of the Grecian women. They traded where trade was profitable, and concealed from others the course they pursued to reach the distant countries to which their traffic extended. Thus, though they had supplied tin and amber for several centuries to the Greeks, Herodotus, who had visited Tyre itself, could obtain only very vague accounts of the countries in which they were produced. The master of a Phœnician merchantman bound for the land which produced tin, perceiving himself followed by a Roman ship which had been sent to learn the way, ran his vessel on the rocks to lead the rival craft to destruction; and on his return home the government remunerated him for the loss he had patriotically incurred. The commerce of Phœnicia appears to have reached its height about the 8th century B. C. Ezekiel (chap. xxvii.) draws a vivid picture of the commercial splendor of Tyre at the end of the 7th century, at which period its trade directly or indirectly embraced the whole known world. By means of the Red sea and the Persian gulf it communicated with India and the E. coast of Africa; on the N. its vessels found their way along the Euxine to the frozen borders of Scythia; beyond the straits of Gibraltar its ships or those of its colonies visited the British isles for tin, and perhaps penetrated even into the Baltic in search of amber; and it is probable that they had several centuries before sailed along the Atlantic coast of Africa beyond the great desert, and had discovered the Canary islands. Beside carrying on commerce on a large scale in fleets and caravans, the Phœnicians appear to have traversed the interior of Syria and Palestine as peddlers, retailing the goods which they had imported or manufactured from house to house, and purchasing at the same time the domestic products of those countries. It was on the sea, however, that the Phœnicians were eminent above all other nations. For their shipping Lebanon afforded inexhaustible supplies of timber, and from Cyprus they obtained every thing else that was necessary for fitting out a vessel. Sidon among their cities appears to have enjoyed the highest reputation for naval skill. Of the form or tonnage or rigging of their vessels nothing is known, except that they were equipped for war as well as for trade, and their discipline was so good that even in Athens, the first maritime state of Greece, Xenophon cites a Phœnician ship as the best example of order and skilful arrangement that could anywhere be found. The Phœnicians were the first to apply astronomy practically to navigation, and they had noticed the connection of the moon with the tides, with which they had become acquainted in their Atlantic voyages.—Of their manufactures, the most famous was that of the purple dye, which they prepared from a shell fish found on the coast. Though a similar purple was produced at various places on the coasts of Greece, Italy, and Africa, Phœnicia, especially the city of Tyre, always maintained its preëminence in this particular. It had the advantage of an inexhaustible supply of the shell fish, a brilliant sunlight, and probably some knowledge of chemistry by which the native color of the liquor was heightened. As Tyre was celebrated for its purple, so Sidon was noted for its glass, the invention of which was attributed by the ancients to the Phœnicians. The Sidonians used the blowpipe, the lathe, and the graver, and cast mirrors of glass. They were also acquainted with the art of imitating precious stones and of coloring glass by means of metallic oxides. They excelled in the manufacture of drinking vessels of gold and silver. Hiram the Phœnician king sent to Solomon to aid in building the temple, an artist, "skilful to work in gold and in silver, in brass, in iron, in stone, and in timber, in purple, in blue, and in fine linen, and in crimson; also to grave any manner of graving." (2 Chron. ii. 13, 14.) The Phœnicians were celebrated also for the manufacture of perfumes. Their skill in mining and metallurgy was apparently greater than that of any other ancient nation, and their mining operations in Spain were carried on upon a stupendous scale and by very scientific methods. —A chief source of the power and wealth and extensive commerce of the Phœnicians was their system of colonization. The progress of their settlements naturally divides itself into three successive eras, during the first of which they colonized the shores of the eastern Mediterranean, including the Ægæan and the Euxine; during the second the central part of the coast of N. Africa; and during the third the remaining coasts of the Mediterranean westward into the Atlantic. Their settlements in the first and second of these areas have no definite chronology, and can only be traced through the clouds of mythic legends transmitted to us by the Greeks. It is probable, however, that they were expelled from the islands of the Ægæan by Minos three generations before the Trojan war, and we may infer that they then settled in Sicily. At an early period they occupied Cyprus, Crete, and Rhodes, where their presence is attested by a multitude of inscriptions. Cilicia, Lycia, Caria, and other parts of the coast of Asia Minor were colonized by them, and their settlements at Thebes and other places in Greece under Cadmus gave rise to some of the most noted legends of the Greeks. The next great step in the progress of Phœnician colonization seems to have been the settlement of promontories and islets on the coast of Sicily. Malta or Melita was one of their earliest possessions in this region. The island of Sardinia is mentioned by Diodorus as one of the places to which the Phœnicians sent colonies after they had enriched themselves by the silver of Spain. On the Spanish peninsula their first settlement was Gadira, the modern Cadiz, which they colonized about 1100 B. C., the first date in their history to which we are able to give a definite position. But the greatest and most successful of their colonies were those in N. Africa, where Ituke, by the Romans called Utica, was founded about the same time that Cadiz was settled. In the same vicinity more than two centuries later Carthage was founded by a colony from Tyre, although there is some reason to suppose a much earlier settlement of the site by a colony from Sidon. It is certain however that it was to the emigration from Tyre, about the end of the 9th century B. C., that Carthage owed its rapid rise to power and opulence. The history of these colonies is in most cases too obscure to allow of our defining the relation in which they stood to the mother country. Their connection was very slight, and was maintained rather by filial piety than by political dependence. The tutelary god of Tyre was also the chief god of Carthage, and the latter city annually sent offerings to the parent temple. When Cambyses threatened to make war on Carthage, the Phœnicians who served in his fleet refused to engage in hostilities against the Carthaginians because they regarded them as their children. On the other hand, the colonies aided the mother country with ships and soldiers in her wars, but they seem to have been entirely independent in all other respects.—From the earliest period of which we have any knowledge the cities of Phœnicia were governed each by a king. Such was the condition of Canaan when invaded by the Israelites. Every town with its adjacent territory constituted a sovereignty. The monarchy was hereditary wherever we can trace its descent, but the sanction of the people was necessary to the succession, and to them the right of election devolved in case of a vacancy of the throne. In Tyre, and probably also in Sidon and the other principal cities, a powerful aristocracy existed along with the monarchy, though we have no precise knowledge on what the distinction of nobility was founded. The chief nobles seem to have held to some extent the functions of a senate. At Tyre, when the throne was vacant, the place of the sovereign was supplied by elective magistrates called *soffets* or judges. A large part of the population of Phœnicia was composed of slaves, who were brought from all parts of the ancient world, and whose numbers were such in Tyre that on one occasion they rose in insurrection and expelled the free population. The cities of Phœnicia were never united under a single monarch, but generally the superior power of some city, at first Sidon and afterward Tyre, enabled it to exercise that controlling power over the others which the Greeks termed hegemony. The three principal cities, Sidon, Tyre, and Aradus, had a place of joint meeting, the town of Tripolis, where measures of the highest importance were decided by a representative assembly, of whose exact nature little is known. The chief defence of the Phœnicians was their naval power, and in later ages, when the rise of the great monarchies on the Tigris and Euphrates threatened their safety, their reliance was on mercenary troops whom their wealth easily procured, chiefly from Africa. The narrow extent and limited population of their own land made it impossible to raise native armies able to cope with the Assyrians and Babylonians, or later with the Persians and Macedonians.—Of the religion of Phœnicia we know nothing except from incidental notices in the Greek and Latin writers, and in the Hebrew Scriptures. From them we learn that polytheism prevailed among the people, and that the chief deities were Baal and Ashtoreth, who are supposed to represent the sun and moon; a deity whom the Greeks called Cronos (Saturn), but whose Phœnician title is not certainly known; Moloch or Melkarth, the especial god of Tyre. Saturn and Moloch were worshipped with bloody sacrifices, in which large numbers of infants were sometimes burned alive. When great dangers from war or other evils menaced the state, the supposed anger of the deities was thought to be averted by sacrificing on their altars the noblest and most beloved children. Our knowledge of the Phœnician religion, however, is derived almost wholly from their enemies, and is merely external. Of the spiritual or moral ideas of the people we know nothing. From the doubtful fragments of Sanchoniathon it may be inferred that their speculative philosophy was atheistic, and that they had no belief in a future life.—The principal Phœnician cities, Tyre and Sidon, were founded, according to the statement of Herodotus, about 2700 or 2800 B. C. For several succeeding centuries they pursued a profitable career of commercial activity. But it is not until the time of Solomon that we have any certain historical knowledge of their affairs. Hiram, king of Tyre, and his predecessor Abibal, are historical personages, and from them we have a regular succession of kings with dates of their reigns. The friendship and alliance of Hiram and Solomon, and the voyages of their fleets to Ophir, are recorded in Scripture. Of Hiram's successors the most noted was Pygmalion, whose tyranny about the end of the 9th century B. C. drove his sister Elissa or Dido into exile with a large body of followers, by whom Carthage was founded. Subsequently the oppression of Tyre produced a revolt in Cyprus, which was joined by Sidon and several other cities. The rebels were assisted by the Assyrians under Shalmaneser, who overran Phœnicia, but made no permanent conquest. He afterward made a second inroad, and besieged Tyre for 5 years without success. Subsequently Phœnicia became involved in war with the Babylonians, whose king Nebuchadnezzar took Sidon by assault with dreadful carnage, and invested Tyre, the siege of which, one of the most celebrated in history, lasted for 13 years, though its issue is strangely enough altogether uncertain. It seems probable, however, that the part of Tyre which was built on an island resisted all the efforts of the besiegers. After the siege there seems to have been much internal disturbance. Judges or suffetes took the place of kings, and there is some reason to believe that to a certain extent Tyre like the rest of the Phœnician cities acknowledged the sovereignty of Babylon. The fall of Babylon before the arms of the Persians was followed at no long interval by the submission of the whole of Phœnicia to Cyrus or his successor Cambyses. Under the Persian monarchy the Phœnician navy was a regular and very important element of the imperial power. But the internal constitution of the cities does not seem to have been disturbed, and the native line of kings continued to reign under the protection of the Persian sovereign, whom they acknowledged as their liege lord. The commerce of the cities flourished by the rich traffic of Arabia and the East which passed through their hands, and their manufactures of purple and glass were in full activity. Throughout the long struggle between Greece and Persia the Phœnicians contributed the naval forces of the Persian monarchs. During the reign of Darius Ochus, Sidon, which had now taken the lead among the Phœnician cities, revolted, and after a desperate struggle was betrayed by Tennes its king to the Persians in 350 B. C., and was utterly destroyed with all its inhabitants, except a few who were absent, and by whom the city was subsequently rebuilt. When Alexander invaded the Persian empire, the Sidonians submitted to him readily, but Tyre resisted, and after a siege of 7 months was taken by treachery and reduced to ashes, part of the inhabitants being slain and the rest sold as slaves. Alexander rebuilt the city, but it never regained its former importance. Phœnicia was incorporated into a Macedonian province with Syria and Cilicia, and its commerce again flourished as in former ages. It afterward fell under the dominion of the Seleucidæ. About 65 B. C. the Romans conquered the country, and from that time till now Phœnicia has shared the fate of Syria. During the crusades Tyre was a port of consequence, but under the rule of the Turks, and especially since the commercial changes consequent upon the discovery of the passage to India by the way of the Cape of Good Hope, it became what it remains to this day, "a rock for fishermen to spread their nets upon."—The language of the Phœnicians bore a very close affinity to the Hebrew, as is abundantly shown by the unanimous testimony of the ancient grammarians and the fathers of the church, who frequently speak of the languages as nearly identical. Numerous words preserved as Phœnician or Carthaginian by the Greek and Latin writers correspond exactly with the Hebrew, as Baal, Adoni, Malka, Suffeta, Gadira, Susa, Alpha, and Tur; and the only satisfactory results in interpreting the Phœnician monuments and coins have been obtained by making the Hebrew the key to their explanation. Out of 94 words in the recently discovered tablet of Marseilles, 74 occur in the Old Testament. Beside inscribed coins and stones, there remains a curious monument of the Phœnician language in its Carthaginian branch in the *Pœnulus* of Plautus, in which one of the characters of the play, a Carthaginian, utters some sentences in his native tongue. In 1837 Gesenius published his *Scripturæ Linguæque Phœniciæ Monumenta*, containing all the extant remains of the language then known, to the number of about 1,000 words. Additions to the vocabulary have since been derived from ancient Carthage, Sidon, &c., and much is expected from M. Renan, who is now exploring Phœnicia. In its original form the literature of Phœnicia has wholly perished, and little has been preserved through Greek translation. Its oldest productions appear to have been philosophical and theogonical, and the Greeks attributed to the Phœnicians Sanchuniathon and Mochus a greater antiquity than that of their own oldest writers. The other writers of Phœnicia are all known to us under Greek names, as Theodotus, Hypsicrates, Philostratus, Dius, Menander, and Hieronymus. A long extract from Dius relating to the intercourse between Hiram and Solomon is given by Josephus, who also quotes from Menander, by whom the histories of the Phœnician cities were written from their local records. The most considerable of these extracts is from the writings of Sanchoniathon, preserved by Eusebius in his "Evangelical Preparation." (See SANCHONIATHON).—The principal modern works on Phœnicia are Movers's *Die Phönizier;* Heeren's "Historical Researches," vol. ii.; and Kenrick's "Phœnicia" (London, 1855).

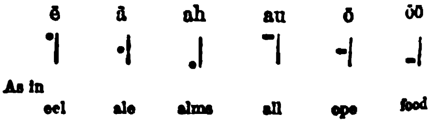
PHŒNIX (Gr. φοῖνιξ), a fabulous bird to which many marvellous qualities were attributed by ancient authors. According to one legend, it lived in Arabia, resembled an eagle, with wings partly red and partly golden, and upon arriving at the age of 500 years built itself a funeral pile of wood and aromatic gums, and, lighting it by the fanning of its wings, was consumed to ashes, out of which arose a new phœnix. The myth is undoubtedly of eastern origin, as similar stories of marvellous birds occur in the literature of Persia and India. By poets and imaginative authors of every age the phœnix has been regarded as the emblem of immortality. The fathers of the church employed it to illustrate the doctrine of the resurrection; and several of the Roman emperors used it on coins to typify their own apotheosis, or the return of the golden age under their rule. Métral's work, *Le phénix, ou l'oiseau du soleil* (Paris, 1824), contains a *résumé* of all that has been written in ancient or modern times upon the subject.

PHŒNIXVILLE, a manufacturing town of Chester co., Penn., on the Schuylkill river, at the mouth of French creek, and on the Philadelphia and Reading railroad, 28 m. from the former and 30 m. from the latter; pop. in 1860, 4,433. There are mines of iron, copper, and lead in the vicinity, and it has extensive iron manufactories, producing great quantities of railroad iron and nails. A rolling mill, supposed to be the largest in the United States, employs from 1,200 to 1,500 men. The Schuylkill navigation company's canal passes through the town. Phœnixville has a lyceum, a newspaper office, and several churches.

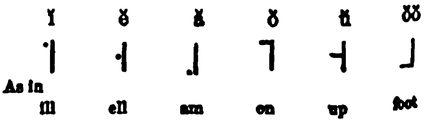
PHONOGRAPHY (Gr. φωνη, voice, and γραφω, to write), a system of shorthand invented by Isaac Pitman, of Bath, England. It was first published in 1837, and has since been greatly modified. It professes to be based upon an analysis of the sounds of the English language, and from this fact was at first called sound hand. The consonants are represented by straight lines and curves. The first 16 in the table below are in pairs, represented by light and by heavy straight lines and curves, corresponding with their near relation in sound. Thus the first sounds in *p*in and *b*in are made by the same articulations, the lips being first compressed together, and then thrown suddenly apart by the expulsion of breath. The first is a whispered sound, the second a sub-vocal, in the latter the muscles of the larynx being called into action. The same principle is applicable to the remainder of the pairs. *T* and *d* are represented by perpendicular marks, the one thin, the other thick; and they stand for thin (whispered) and thick (voiced) sounds. Take the first sounds of *t*in and *d*in; experiment will show that the articulations are similar, the tongue coming in contact with the roof of the mouth near the roots of the upper front teeth in the production of either sound. The third pair, *ch* and *j*, are also made by articulations resembling each other, as observed in the first sounds of *ch*est and *j*est. The same is true of *k* and hard *g*, as in *K*ate, *g*ate; of *f* and *v* in *f*ine and *v*ine; of the pair marked *th*, whispered as in *th*in, vocalized as in *th*is; of *s* and *z*, in *s*eal and *z*eal; of *sh* and *zh*, in *s*ure and *az*ure. It is to be particularly observed that the powers of these letters are referred to above, and not their names of *pe, be, te, de, ka, ef, ve,* &c. The following is a table of the single consonants:



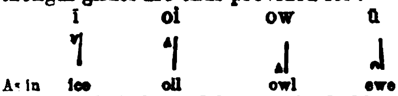
The vowels are represented by dots and short dashes, which are made heavy and light to represent long and short vowels. The 6 long vowels are:



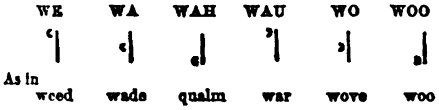
The short vowels are:

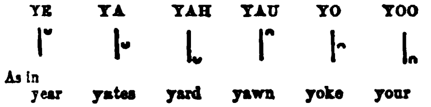


By a change of position, the heavy dot is made to represent 3 vowels; the light dot, 3; the heavy stroke, 3; the light stroke, 3; in all, 12. They are placed respectively at the beginning, middle, and end of a consonant. The upright stroke to which the vowels are placed in these examples is no part of the vowel sign; it is the phonographic sign for *t*, and is employed merely to indicate the positions of the vowels, namely, 1st, 2d, and 3d place. The diphthongal glides are thus provided for:

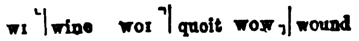


The sounds indicated by *w* and *y* hold a middle place between vowels and consonants; that is, they are less open than vowels, and less obstructed than consonants. They are sometimes called coalescents, because they are never used except immediately preceding a vowel with which they closely coalesce. By prefixing respectively the simple sounds of *w* and *y* to the simple vowels given above the reader will have this series, which is represented as follows:

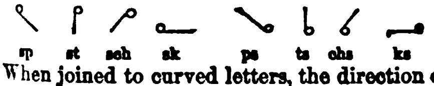




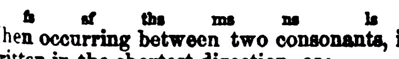
W and *y* are also furnished with single forms, as seen in the table of consonants. The briefer sounds, as heard in *yet*, *yam*, *yonder*, &c., are indicated by lighter marks. *W* and *y* prefixed to the diphthongs ī, *oi*, and *ow* are thus represented:



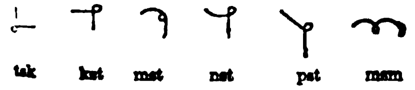
The aspirate *h* is never used except immediately preceding an unobstructed or vowel sound, and is simply an initial, audible breathing through the position which the vocal and articulating organs assume to pronounce any given vowel. This unobstructed whisper *h*, though it has as many different powers as there are vowels, still, being thus uniformly used, is fittingly represented by a small dot placed immediately before any vowel, thus indicating that the vowel is to be preceded by the aspirate. The stroke sign for *h* is employed when a word consists of a vowel and aspirate only, as in *hay*, *hue*, &c.—*S*, the most frequently occurring consonant in the language, is represented by a circle, which is made somewhat thicker for *z*. The circle is joined to straight letters thus:



When joined to curved letters, the direction of the curve is followed, thus:

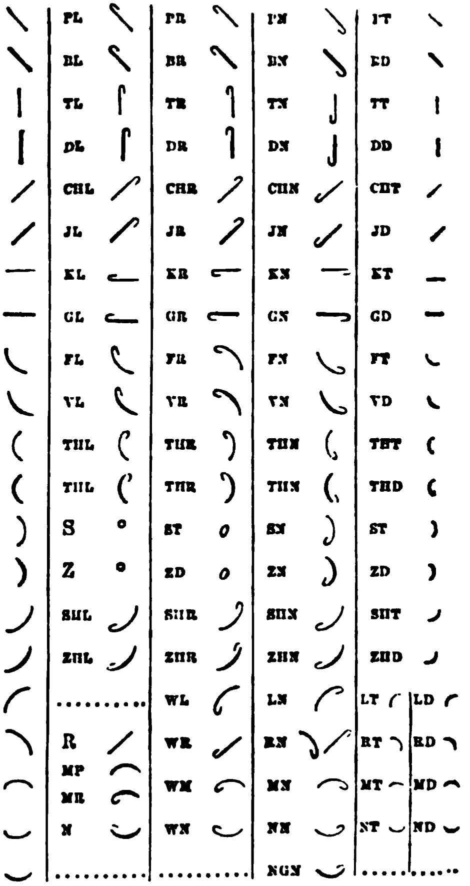


When occurring between two consonants, it is written in the shortest direction, as:



The above is the phonographic alphabet proper. For greater facility in writing, however, several series of abbreviations have been adopted. The following is a

TABLE OF SINGLE AND DOUBLE CONSONANTS.


PL
BL
TL
DL
CHL
JL
KL
GL
FL
VL
THL
THL
S
Z
SHL
ZHL
R
MP
MR
N
PR
BR
TR
DR
CHR
JR
KR
GR
FR
VR
THR
THR
ST
ZD
SHR
ZHR
WL
WR
WM
WN
PN
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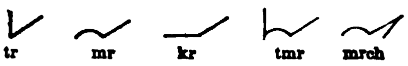
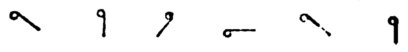
MN
NN
NGN
PT
BD
TT
DD
CHT
JD
KT
GD
FT
VD
THT
THD
ST
ZD
SHT
ZHD
LT
LD
RT
RD
MT
MD
NT
ND

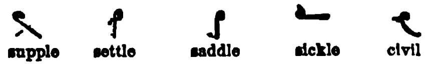
R is also represented by an additional sign, namely, a slanting up-stroke, which is always written and joined in an upward direction, thus:



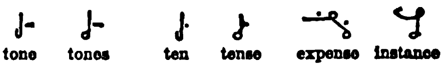
Consonantal diphthongs in which *l* and *r* are used in conjunction with all the other consonants are of very frequent occurrence in the language. These glides being uttered with almost as little effort as simple sounds, they are appropriately represented by a slight modification of the simple letter. (See the 2d and 3d columns of the table above.) From the *pr* series of double consonants a treble series is formed by making the hook into a circle, thus:



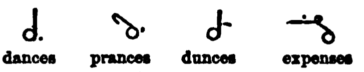
S is prefixed to a consonant of the *pl* series thus:



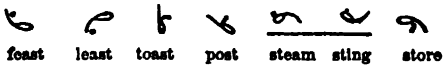
S or *s* is added to the *n* series by making the hook into a circle, thus:



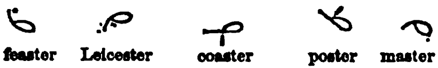
The circle is enlarged for *nses*, thus:



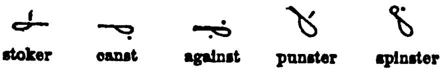
St is written by a loop half the length of a straight consonant, as:



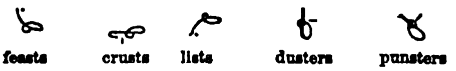
A larger loop or oval represents the treble consonant *str*, thus:



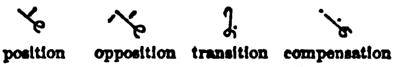
These loops may be added to the *pr* series of consonants, and to the *n* hook when final, thus:



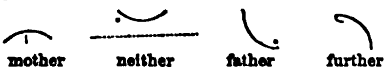
A final *s* may be added by continuing the stroke of the loop, thus:



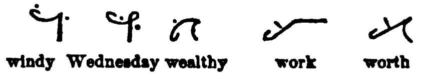
A hook made by continuing the *s* circle to the other side of the consonant adds *tion*, as:



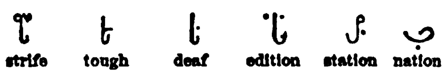
A curved consonant written twice its usual length adds *thr*, as:



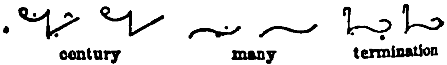
The vowel sign for *w* may be prefixed to *l*, *r* (upward), *m*, and *n*, thus:



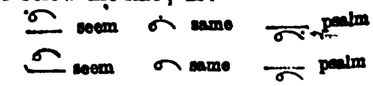
A final hook on the right hand side of straight consonant signs represents *f* or *v*; the termination *tion* is expressed by a larger sized final hook:



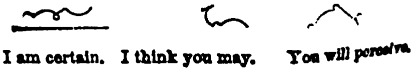
Halving a consonant adds *t* or *d*, according as the consonant is thin or thick. (See the last column of the table.) The general rule for writing consonants is to write them from top to bottom, and from left to right. *L*, however, when standing alone, is written upward; *sh* may be written upward or downward, as is most convenient; when two straight consonants, such as *pp*, *kk*, follow each other, they are made by a continuous line double the length of a single consonant.—With the exception of certain prefixes, affixes, and abbreviated words termed grammalogues, which it is unnecessary to present, the above is the first or corresponding style of phonography, according to the 9th edition. A 10th edition, however, has been published in England, in which the vowel scale has been changed to the following order: *ah*, *ā*, *ē*; *ă*, *ĭ*, *ĕ*; as in *alms*, *all*, *eel*; *at*, *it*, *et*. But as it has not been adopted by authors of text books or by students in this country, it has not been followed in this account of the system. It will be seen that phonographic spelling harmonizes with the pronunciation of words. Each sound is represented by a special character; therefore to write any given word phonographically, its several sounds must first be ascertained; the student should then write the phonographic letters which compose them.—While phonography is strictly a system of shorthand, each letter being made by a single motion of the pen, the facility it affords for abbreviation renders it peculiarly adapted for reporting purposes. The large outlines of the consonant signs, as compared with the dots and short dashes which are used to represent vowels, will be likely to suggest the word of which they form a part, even though the vowels are omitted, as will be seen by a few examples:



The principle of position is hardly of secondary importance. Three positions for words are recognized, corresponding with the three vowel positions. Words which are to be indicated by the position they occupy are written as follows: those whose accented syllable contains a first place vowel in the first position, or above the line; containing a second place vowel, upon the line; containing a third place vowel, through or below the line; as:



(In this and some previous examples, the dotted line indicates the line written upon.) In the reporting style, beside this principle of abbreviation, a great many phrases are written without lifting the pen, and are called phraseograms, the employment of which is generally necessary in making verbatim reports. From 6 to 10 words are sometimes embraced in a phraseogram, and it is generally conceded that they are more legible than the same words written separately, on a like principle that numerals, which embrace a smaller space and are taken in more readily by the eye, are more easily read than when the number is spelt out; as for instance, 1861 is read with greater facility than eighteen hundred and sixty-one.



Phonography differs from other systems of shorthand chiefly in its more extended phonetic basis, and in the simplicity of its alphabet, the simplest geometrical characters having been adopted.—Since the invention of phonography its dissemination has been very rapid. It is the system generally adopted by reporters in this country and in Great Britain. It is also used by professional men, by ministers for writing their sermons, and by lawyers to take notes of evidence, its legibility rendering it peculiarly adapted to these purposes. Four monthly periodicals in phonographic characters are published in England, one in Australia, and two in the United States. There have been 600,000 copies of the system sold in England and the British colonies, and probably about half that number in the United States. Including the yearly volumes of the phonetic periodicals, about 100 volumes of engraved phonographic literature have been issued up to 1861.

PHOSPHORESCENCE (from resemblance to the light of phosphorus when slowly oxidized, or directly from the Gr. φῶς, light, φέρω, to bear), a luminousness or light, usually faint, and emitted continuously rather than by flashes, but during a time varying from a small fraction of a second to several minutes or even hours, by certain organized bodies, living or dead, and also, after exposure to extraneous sources of light, by a large number of mineral bodies in the solid state. The phenomena that have ordinarily been included under the term phosphorescence are in reality widely different, and they require to be properly discriminated. The light given out by certain insects has been observed from very early times. The ancient navigators were familiar also with the luminosity sometimes appearing on the surface of seas or bays; and these appearances they termed "meteors of the sea." In rare instances the human body is said to have appeared luminous, as have also certain plants, but especially their flowers. Several fungi and agarics are said in this way to emit light. Mr. James Drummond describes species of agaric, growing on the trunks of banksias, near Swan river, which gave at night a light enabling him to read; and certain rhizomorphous fungi growing in the coal mines of Dresden have long been celebrated for the illumination, feeble indeed, which they throw around them. The flowers of nasturtium, orange lily, African marigold, sunflower, and others, all of orange hue, are said to show an intermittent light during warm summer evenings, toward twilight; but Professor Allman suggests that this may be an optical illusion. The luminousness of putrefying fish, shell fish, or other animal substances, and of decaying wood, is well known; the latter is the appearance vulgarly termed "fox fire." Diamonds, especially the yellow, exposed for a time to the solar rays (insolated), when carried into a dark place, emit for some time a light which pales gradually until entirely extinguished. So of oyster shells calcined with sulphur, and many chemical preparations and other minerals, the class of bodies possessing this property being named phosphors or phosphori. Thus, under the single term phosphorescence, are grouped at the least 5 distinct kinds of phenomena, agreeing in the fact that the light and the circumstances producing it are peculiar, and that the rays emitted are, so far as experiment can yet detect, luminous only, or at least destitute of accompanying heat, viz.: 1, light of insects and other animals, due to feeble combustion of matters produced within their organism and during the living processes; 2, the same, due to direct evolution or vital action, and so analogous to the production of electricity, and the nervous and muscular forces; 3, evolved in ways similar to the two foregoing, by plants; 4, due to slow combustion, attending decay, of organized materials; 5, due, in mineral bodies, to an agitation produced within their substance, during exposure to an extraneous source of light, and radiated with lessening intensity, as such agitation decreases, down to the point of extinction. It will be proper to consider further, in this place, only the last of these cases; the first and second being treated of in the articles FIREFLY and GLOW-WORM, and the others being less important. In the articles LIGHT and COLOR it is shown that an illuminated body is in reality one that is made secondarily or temporarily luminous, by reason of the falling of light from some other source upon it. Most frequently, the color of this temporary luminosity agrees with that of the whole or some part of the rays exciting it. Some bodies, however, change the character of the rays before reëmission; thus, violet light, striking a colorless solution of sulphate of quinine, is emitted blue. (See FLUORESCENCE.) So far as the eye detects, this and ordinary illumination cease the instant the rays of the exciting luminary cease to be received upon the body. But the truth probably is that no body ceases to be visible the instant it ceases to receive light. The luminous agitation and secondary emission persist after withdrawal of the illuminating rays; but, in liquids and gases (save oxygen and common air), in black bodies, and in all metals, such persistence is so brief and fugitive, that it has thus far escaped detection. In other solid bodies, the persistence of light-giving after cessation of light-receiving is either, as in diamond and fluor spar, of such duration as to be examined at our leisure, or, as in a still larger proportion of these bodies, so brief as to have been unsuspected until tested by very ingenious experiment. Now, this continuing secondarily emitted light is phosphorescence, in the last of the 5 forms named above. This view agrees substantially with that put forth by Prof. J. W. Draper, of New York, as the result of observations undertaken by him as far back as the year 1840, and renewed since that time. Among the conclusions arrived at by him are, that a phosphorescent, even at its maximum of glow, has not perceptibly changed its volume; that there is no attendant development of electricity; that the intrinsic brightness of a phosphor is very small, the maximum of a fine specimen of chlorophane (a variety of fluoride of calcium) being but $\frac{1}{3040}$ part as intense as the flame of a small oil lamp; and that some phosphors are excited to greater luminosity by light from the sky, or that through a violet glass, than by direct sunlight. If we adopt the view of M. E. Becquerel, this is probably because, when the temperature is raised, as it is by the direct sunbeam, the phosphorescence is more rapidly expended, and even during insolation. Other conclusions of Draper, among them that phosphorescence of this form is attended with slight increase of sensible heat, are rendered questionable by results of the later and extremely patient researches of Becquerel, whose exhaustive paper on this subject occupies the entire number of the *Annales de chimie et de physique* for Jan. 1859. This physicist examined in order the mineral and organic substances capable of being rendered self-luminous after some moments' insolation, or exposure to other sufficient light; and he greatly facilitated his investigations by the invention of an instrument which he has termed a phosphoroscope. In this, a cylinder of wood, about 1 inch in diameter and 7 inches long, is so placed in a projecting angle in the side of a black box, that three fourths of its surface are, during any revolution, outside the box, and in the darkened room in which are the spectators; the remaining fourth being in the box, and illuminated by the voltaic light, and the escape of this about the edges of the cylinder being prevented by properly attached strips of black velvet. The cylinder can be turned at any speed up to 800 revolutions per second; and by added mechanism the actual velocity can be indicated. The cylinder is coated over with fine crystals or powder of the body to be tested. If, then, the persistence of light be but $\frac{1}{20}$ of the most rapid revolution named, after illumination has ceased in consequence of the surface leaving the source of light within, so that its duration is but the $\frac{1}{8000}$ part of a second, still the phosphorescence will come into view along the emerging side of the cylinder without, and sufficiently to be visible. The rate of revolution being known, and the part of the outer surface of the cylinder that becomes lighted up observed, the duration of the phosphorescence for any given substance and modification of substance is readily determined. The cylinder, if coated with an ordinary phosphor, and rapidly turned, appears in the dark room luminous all over. If the body be very briefly phosphorescent, a velocity is readily found at which the light shall show along the emerging side of the cylinder; and then, turning faster, it spreads over half or more of the exposed surface a soft gleam, white, blue, or green, &c., dying away into a portion totally dark. Thus, in this apparatus, time is expressed to the eye in space, and so measured. With it, M. Becquerel found that time is consumed in elevating the phosphorescence of any substance to its maximum; that, generally, the phosphorescence is less brilliant than the incident light, exceptions being that it is in many bodies best excited by the feeble violet, or even by the dark rays beyond the violet; that, generally, its intensity is independent of the duration of exposure, but is a function of the intensity of the exciting rays; that both intensity and color depend much on certain physical modifications that can be produced by peculiar modes of preparing the substances examined, and on temperature—the sulphuret of strontium, for example, obtained by reaction of S on Sr above about 600°, emitting a violet glimmer at low temperatures, blue at 40° C., greenish at 70°, greenish yellow at 100°, and orange at 200°; that the total action is greater and the gleam longer as the temperature is lower, while, with the same substance, the color may vary at different periods after exposure; that, however, the phenomena are not due to chemical causes, but consist essentially in a physical change, or, as the author expresses it, depend on variations of equilibrium in the molécular condition of bodies. By prosecuting the subject from the point of view thus obtained, Becquerel has discovered more brilliant phosphors than any before known; especially the sulphurets of the alkaline earths, barium, strontium, and calcium. After these, in order, he places most varieties of diamond, and the fluoride of calcium; then, many other bodies luminous only for a few seconds or part of a second, including other compounds of earths and alkalies, the alkalies themselves, succinic and oxalic acids, borax, &c. Among organic bodies, dried paper, silk, cane sugar, milk sugar, teeth, &c., are prominent. Mr. Phipson has lately found that milk sugar, as well as cane sugar, becomes luminous upon concussion, or on fracture; while, to secure a brilliant phosphorescence from the nitrate of uranium, it is only required to shake briskly in the dark a bottle containing a certain quantity—a pound or more—of the crystals of this salt. It was previously known that the human epidermis possesses this property; the hand, for example, if exposed to the sun's rays, and then immediately withdrawn into a dark room and held before the eyes, being visible for a short time after it has ceased to receive the light. So, again, if a piece of the mineral apatite, or of fluor spar, be heated, it will while yet far below redness emit a glow of increasing intensity, and so has become by some internal change a source of light originated in the way of phosphorescence. A similar effect is observed when two pieces of quartz are rubbed together in the dark. M. Becquerel found that heat accelerates the phosphorescence of any body, rendering it more intense, and, after removal of the exciting cause, correspondingly more brief; and also, that to some extent the color of the emitted light depends on the molecular condition of the body; that this color, *i. e.*, the refrangibility of the emitted light, is generally lower, and hence the wave length greater, than that of rays exciting it; while, in applying the different rays of the spectrum to show the phenomenon, the result was usually an increase of brilliancy under the action of the more refrangible rays, and greatest often above the violet, though there were also at different places in the spectrum bands of no action; that the lower bands of color in the spectrum often neutralized, wholly or in part, the effect of the upper; and that, nevertheless, different bodies are often susceptible of shining only within different limits in the spectrum. Aragonite, Iceland spar, and glass give vivid light during 15 to 20 seconds; chlorophane and some diamonds, though less luminous, shine for more than an hour. The electrical light admirably excites phosphorescence; best of all, the violet arch formed between the poles in tubes containing rarefied air. With the electric spark, the time required to induce a perceptible glow is not greater than $\frac{1}{3000}$ of a second; but to reach a maximum effect, the time is greater. Finally, phosphorescent light was not found to affect the thermometer, nor to occasion chemical change. A practical consequence of these investigations, of singular character, was arrived at; namely, that the flint glass prisms and lenses of optical instruments may be expected to phosphoresce, or act as luminous sources, the new light mingling with that which is transmitted, and modifying the image or vision accordingly. Perhaps the most interesting of Becquerel's discoveries is one yet to be stated. Since the electric light, if transmitted through glass, loses mainly the rays which excite phosphorescence, the experiment of passing the former light over fragments of the body examined, in the rarefied air tube, was resorted to; but here it was frequently found that a glow upon these fragments, usually differently colored from that of the electric light at the time, and which lasted during the electric illumination, gave place after the current was cut off to light of a different color, and which persisted for a longer or shorter period; in other words, fluorescence and phosphorescence here occurred in succession. Hence Becquerel inferred that the two phenomena are essentially one, and different only in the time during which in the two cases the excited condition lasts. Experiments with the phosphoroscope speedily confirmed this conclusion. If, for example, the cylinder was covered with fine crystals of nitrate of uranium, its revolutions, at any moderate velocity, brought no light into view; at very high rates of revolution, it appeared along the emerging side; but it could not, by any speed practicable, be made to cover the whole cylinder. Thus it was made evident that fluorescence is a phosphorescence accompanying the action of the exciting rays, and on their removal almost instantly falling to inactivity. In some of the experiments, oxygen gas and common air, through which the electric current was passed, retained distinctly for some time after its cessation the phosphorescent state. M. Becquerel apprehends that these researches must tend to elucidate the manner in which luminous vibrations become modified in consequence of the entrance of the rays within substances of different kinds, thus leading toward an explanation of the phenomena of color. He regards them as supporting the undulatory theory of light; and he is led to the general conclusion that luminous vibrations, transmitted to many bodies, perhaps to any body, compel its molecules to vibrate for a time, and with an amplitude and wave length dependent, not alone on the chemical constitution of the mass, but also on its physical condition.

PHOSPHORUS (Gr. φῶς, light, and φέρω, to carry), an elementary body represented by the symbol P. Its chemical equivalent is 32; specific gravity 1.77, and that of its vapor 4.355. It was discovered in 1669 by Brandt of Hamburg in the solid ingredients left by evaporating urine. For 100 years this was the only known source of it. The process of obtaining it was expensive and understood by a few only. In 1680 Robert Boyle's receipt for making it was published in the "Philosophical Transactions of the Royal Society;" and at this time a chemist in London, named Hanckwitz, prepared it to be used for igniting sulphur matches, a little piece of the phosphorus being made to inflame by rubbing it in paper. In 1769 Gahn and Scheele found that it was an ingredient of bones, and made known the method of separating it. Afterward it was found in various rocks, especially in combination with lime in the mineral apatite or phosphate of lime. By the decomposition of the rocks containing it, phosphorus passes into the soil and is thence taken up by plants, of many of which, especially of the grains used for food, it forms an important element. Thus it is received into the animal system, and in this is an essential ingredient in the composition of the brain and nerves. Phosphorus is a semi-transparent, nearly colorless substance, flexible, and so soft that it can be cut with a knife, and then exhibits a waxy lustre. It is tasteless, but exposed to the air it emits a vapor having an odor like that of garlic. This vapor, as also the phosphorus itself, is luminous in the dark. It melts at 111.5°, and, if beneath an alkaline liquid, may if undisturbed remain fluid when cooled. It takes fire in a warm atmosphere, and is consequently most safely kept under water, in which liquid it is insoluble. Even at ordinary temperatures it slowly and insensibly consumes and at last disappears. If this process takes place in a bell glass over water, oxygen is found to be absorbed as in ordinary combustion, and the process ceases if the supply of oxygen is insufficient for complete combustion. Phosphorus boils at 554°, and it may then be distilled, and thus be obtained in purified form. Great precautions, however, are requisite in the arrangement of the apparatus on account of its ready inflammability, and the severity of the burns caused by it. The solvents of phosphorus are ether, naphtha, dichloride of sulphur, and bisulphuret of carbon. From its solution it may be obtained crystallized in rhombic dodecahedrons. Several allotropic forms of phosphorus are known, of which that described by Schrötter (*Annales de chimie* [iii.], xxiv. 406) by the name of the red amorphous phosphorus presents some striking differences from the ordinary stick phosphorus, and ought especially to be familiar to those engaged in the manufacture of matches, for which phosphorus is largely employed, inasmuch as it is entirely free from the poisonous vapor which renders the use of the common article extremely dangerous to the health of the workmen. This variety is formed by keeping stick phosphorus several hours at a temperature between 446° and 482° in a retort filled with hydrogen or carbonic acid, neither of which exerts any action upon it. Distillation takes place, and both sorts of phosphorus are obtained. They are separated by treatment with bisulphuret of carbon, which dissolves the ordinary phosphorus and leaves the red in an amorphous powder. This is then fused and afterward solidified. It is hard and brittle, not so luminous nor so highly inflammable as the other kind, and has not the same poisonous properties. It undergoes no change in the air and emits no odor. Its specific gravity is 2.14. At about 482° F. it takes fire and burns with dazzling brilliancy. If prepared at as high a temperature as it will bear, it may acquire the color of vermilion. It has been manufactured in England upon a large scale with a view to its substitution for ordinary phosphorus in matches; but its preparation is attended with considerable danger, and its use involves increased expense. Common phosphorus is prepared from calcined bones, which are composed of carbonate and a basic phosphate of lime. Those of the sheep furnish the largest proportion of phosphorus, and are most easily acted on by acid. The bones being pulverized are mixed with two thirds their weight of strong sulphuric acid and 6 times their weight of water, and the mixture after being well stirred is left for 24 hours. The carbonate of lime is decomposed, the lime being converted into a sulphate; and the basic phosphate, losing two thirds of its lime, is converted into a soluble acid phosphate known as the superphosphate, which retains all the phosphorus. The change is expressed by the following formula:

$$\overbrace{3\,CaO,\,PO_5}^{\text{Bone ash.}} + \overbrace{2\,(HO,\,SO_3)}^{\text{Sulph. acid.}} = \overbrace{2\,HO,\,CaO,\,PO_5}^{\text{Superphosph. lime.}} + \overbrace{2\,(CaO,\,SO_3)}^{\text{Sulph. lime.}}.$$

By filtering through a linen bag the solution is separated from the insoluble sulphate of lime. It is then evaporated to the consistency of a sirup, and being mixed with one fourth its weight of powdered charcoal is heated and well stirred until it becomes a dry powder. This is placed in an earthen retort, which is luted on the outside with fire clay and borax to render it less porous, and the retort is gradually heated to redness. The superphosphate of lime is now decomposed; the basic phosphate is reproduced by the escape of the excess of phosphoric acid and water, both of which are decomposed as they come in contact with the incandescent charcoal, and produce phosphorus, carbonic oxide, and hydrogen. The basic phosphate remains in the retort. The other products pass through a copper tube into a receiver containing water, in which the phosphorus condenses in yellow drops, while the gaseous bodies pass off through an open escape pipe. Almost a pound of phosphorus may be obtained from a quart retort filled with the materials. The phosphorus is purified by fusing it under warm water and then squeezing it through wash leather. It is moulded into the form of sticks by introducing a glass tube, slightly tapering, into the melted substance, and causing this to ascend by sucking. When sufficiently full the opening at top is closed with the finger, and the tube is drawn out and plunged into cold water. When the phosphorus hardens it is pushed out of the larger end of the tube with a rod. Another method has been employed by which the melted phosphorus is made to flow into horizontal glass tubes, of which one end is kept in water heated above 111° and the other in cold water. Out of the cold end the substance may be drawn almost in a continuous stick.—Another method of making phosphorus is recommended in the "American Journal of Pharmacy," vol. xxiv. p. 167, by which the calcination of the bones is avoided. These are digested for several days in dilute nitric acid, and from the solution acetate of lead throws down the phosphorus in an insoluble phosphate of lead. This, being washed and dried, is heated red-hot in a crucible, and is then mixed with charcoal powder and distilled in the usual way. The bones deprived of their earthy matter may be used for the manufacture of glue. The shavings of horn are well adapted for this use, as they contain twice as much phosphate of lime as ordinary bone. From the residue a nutritious jelly may be obtained.—The manufacture of phosphorus is carried on chiefly in France, Prussia, Baden, Bavaria, Austria, and Sardinia. In 1844 all that was consumed in England was imported from the continent of Europe, and within the memory of those now living its cost was 4 guineas per pound, while now it is worth less than 3*s*. The consumption, however, does not appear to have largely increased in that country, notwithstanding the manufacture has been there introduced. The importation ceased altogether in 1850, and other materials are largely substituted for it in the manufacture of matches. The production of England and France together in 1859 was estimated at about 300,000 lbs. The consumption is almost wholly for matches. It is used in medicine, acting in small doses as a general stimulant. The form in which it is administered is generally its solution in oil, an ounce of almond oil taking up 4 grains of phosphorus, of which from 5 to 10 drops are given for a dose. It has also been given in cod liver oil, and in chloroform. Recently a preparation called pyrophosphate of iron has come into extensive use as a tonic and alterative, in which phosphorus in the form of pyrophosphoric acid is an essential ingredient. In many cases where death has become imminent from exhaustion of the vital forces, as in the last stage of all severe continued fevers, such as typhus, yellow, and other fevers, phosphorus reanimates the vitality, and furnishes nature with the means of effectually resisting the disease, eliminating by the natural excretory outlets of the system its material causes. It is useful in all acute eruptions when the disease has retreated from the surface, as in measles, small pox, erysipelas, &c., as well as in malignant pustule. It is often successfully used in many chronic affections when attended with much debility, as gout, rheumatism, paralysis, excessive debility, amenorrhœa, sterility, impotence, blindness, deafness from paralysis of the nerves of sight and hearing, &c. The homœopathists reverse almost all these indications, and use it in many acute fevers and inflammations, especially in inflammations of lungs and of the female breast, in croup and hoarse coughs. Phosphorus, being a component portion of the nervous tissue, is as useful in many nervous affections as iron is in diseases of the blood. Taken in substance into the stomach it acts as an irritant poison, for which the proper antidote is a speedy emetic. Copious draughts of water should be swallowed in case of solutions of phosphorus having been taken in large quantity; and magnesia added to the water would serve to neutralize any acids produced in the stomach. It is also recommended in combination with 3 times its weight of chlorine water. The vapor of phosphorus, to which the makers of matches are exposed, causes a disease of the jaw bone which becomes carious, so that it has sometimes been removed as the only means of saving the life of the sufferer. (See MATCH.)—The compounds of phosphorus with oxygen are 4 in number, viz.: phosphoric acid, PO_5; phosphorous acid, PO_3; hypophosphorous acid, PO; and oxide of phosphorus, P_2O. The first, which is the most important, is obtained in the form of a white, flocculent, very deliquescent powder, by burning phosphorus in oxygen or atmospheric air. It has a great affinity for water, and may be obtained combined with it in 3 different proportions, severally known as the proto-, deuto-, and trito-hydrate of phosphoric acid. The second of these ($2HO, PO_5$) is the pyrophosphoric acid named above, and used in medicine in combination with soda, and also with lime, and again with iron. Its name is derived from the method of preparing its combination with soda by applying heat to the rhombic phosphate of soda. The first, known also as metaphosphoric acid and glacial phosphoric acid, is much employed in processes connected with dyeing, calico printing, enamelling, and the purification of some oils and fats, in preference to other acids that have been used for the same purposes. It is obtained by digesting finely ground bone ash with diluted oxalic acid and evaporating. Numerous natural combinations of phosphoric acid with bases exist among minerals, the most important of which is the phosphate of lime or apatite, consisting of phosphoric acid 42.26, lime 50.00, and fluorine 3.77. Limestones that contain it in considerable quantity make valuable manures; and the bones that are used for the same purpose derive their fertilizing qualities chiefly from the phosphate of lime. Guano derives a large share of its useful properties from the salts of the same acid. What is called the superphosphate of lime is an acid phosphate produced by treating ground bones with one fourth their weight of sulphuric acid. The triphosphate is converted into an acid phosphate, and the mixture consists beside of sulphate of lime and the gelatinous portions of the bone, all of which possess fertilizing properties.

PHOTIUS, patriarch of Constantinople, and reputed author of the Greek schism, died in 892. The place and time of his birth are not mentioned. He was related by the marriage of his uncles to the patriarchal and imperial houses; and in 857, when he first appears in history, he was the secretary of state to the eastern emperor. He had made himself necessary both to the emperor Michael III. and to his minister Bardas. A quarrel with the patriarch Ignatius, who opposed the forcible removal of the mother and sisters of the emperor to a convent, seemed to require a change in the occupancy of the see. Ignatius was sent into exile, and though he could not be persuaded to resign his dignity, his place was declared vacant, and Photius was installed as his successor. The election was irregular in several particulars. It was made by the will of the Cæsar and not by the authorities of the church; the candidate was a layman, and moreover already a schismatic, adhering, as it was said, to the party of the Sicilian bishop against the Byzantine primate. These formidable difficulties did not, nevertheless, hinder his promotion. In 6 days he passed through the various grades, and was ordained patriarch, his friend Asbestas of Syracuse, the enemy of Ignatius, presiding at the ceremony. The consent of the neighboring bishops was with difficulty obtained. Deceived by a stratagem, they became the enemies of the usurper, while they seemed to uphold him. The timely embassy which Photius sent to Rome with the false statement of the voluntary resignation of

Ignatius, and with assertions of the orthodoxy of the new incumbent, gained over for a time the pope, Nicholas I. A council at Constantinople of 318 bishops, in 861, confirmed the election, deposing Ignatius and condemning him to degradation and exile. This decree, however, was soon annulled by another council which was called at Rome by the pope, in which Photius was anathematized in turn, and ordered to relinquish his claim. Photius at first treated this summons with contempt, and called at Constantinople still another council in 867, in which he excommunicated the pope, and accused the Roman church of heresy. On the death of the emperor Michael and the accession of Basil to the eastern throne, Photius was banished and Ignatius restored; and in a council held in 869 the acts of the unlawful council held by Photius were solemnly abrogated and its records burned. After an exile of 8 years, Photius was allowed to return to Constantinople, where he speedily regained favor; and in 878, on the death of Ignatius, he obtained the consent of both emperor and pope to his assumption of the patriarchal place. The promise which the pope required was not, however, fulfilled. Photius opposed the restoration of the Bulgarians to the Latin church, and did not recant his own heresies. A new excommunication came from Rome, the sentence of the former Roman council was reaffirmed, and in 886 Photius was finally banished by the emperor Leo to an Armenian convent, where he died.—Photius has importance in history as the founder of the Greek schism, as a dogmatist, as a philosopher, and as a literary critic. Though he did not consummate the separation between the Greek and Latin churches, he created a division which was never healed, and after him no confession of supremacy could be wrung by the pope from the Greek patriarch. He drew up charges against the Latin church, that they shortened the season of Lent, refused to allow married men to enter the priesthood, denied to priests the right to administer the chrism, and above all that they taught the double procession of the Holy Spirit. Of his numerous works, the most important is the *Bibliotheca*, which contains fragments of nearly 800 Greek prose writers, most of whose works are lost, with critical remarks thereon. Editions of this work have been published in Augsburg (1601), in Geneva, with a Latin translation (1611), and in Berlin by Bekker (1824). He also left a "Lexicon" (Leipsic, 1808; London, 1822); the "Nomocanon," a collection of canonical decrees, epistles, and statutes concerning the church (Paris, 1615); a collection of 248 letters (London, 1651); theological tracts, contained in Combefi's supplement to the *Bibliotheca Patrum;* and a treatise on "Consolation," edited by Rittershusius (Nuremberg, 1601). Some additional fragments of his writings are contained in the collection published by Cardinal Mai in 1825–'7 from the MSS. in the Vatican. An excellent monograph on the life and influence of Photius, by the abbé Jager, was published at Paris in 1845, and has passed through several editions.

PHOTOGRAPHY (Gr. *φως*, light, and *γραφω*, to write), the art of depicting objects by the agency of light, sometimes termed the photogenic or heliographic art. The earliest observations on the chemical changes produced by the agency of light were doubtless those of the fading and bleaching of vegetable colors. The delicate tints that may be obtained from the parts of plants are usually so unstable or fugitive, as it is termed by painters, that they are unsuitable for the purposes of permanent dyeing. Some are so sensitive to light that an exposure of only a few moments is sufficient to injure them; others resist for a longer time the conjoint action of sunlight, air, and water. The old process of bleaching, as conducted in bleachfields, was strictly a photographic operation. The cloth to be whitened was exposed on the fields to the sun, being occasionally moistened with water. Oxidation of the coloring matter it had originally contained by degrees took place, and after a certain period of time the fabric became perfectly white. It was noticed by the alchemists, probably about the 12th century, that the chloride of silver blackens by exposure to the sun, though when first prepared it is as white as snow. This darkening is in a general manner proportional to the brightness of the light. It does not occur instantaneously, but in a regulated way, a given quantity of light being apparently necessary for the production of a definite effect. As experimental chemistry was cultivated, the list of substances thus influenced became greatly extended, so that at the time when Berzelius published his work on chemistry, several scores of bodies were known to be changeable by luminous agency. Some of these were elementary bodies, and some were compounds, derived from both the inorganic and organic groups. Perhaps the first germ of photography as an art is presented in an experiment of Priestley's, who caused some chloride of silver to be deposited on the side of a glass bottle, and then putting round the bottle a piece of dark paper out of which letters had been cut with a penknife, the arrangement was exposed to the sun. All those portions of chloride upon which the light had fallen, through the spaces where the paper had been removed, turned black, but those protected by the dark paper retained their whiteness unimpaired. A sun print or sun writing was thus produced. Attention having been thus drawn to the changing appearance of chemical substances through the action of light, Scheele, a Swedish philosopher, who shares with Priestley the honor of discovering oxygen gas, made some very instructive experiments for the purpose of determining whether it is some specially colored ray of light, or light in the aggregate, that produces the result. He caused a beam to enter a darkened chamber through a hole in the window shutter, as in Newton's experiment for the decomposition of light, and, intercepting the beam by means of a glass prism, dispersed it into its constituent rays. The colored spectrum thus produced was received on a sheet of paper painted over with chloride of silver. It was thought that if the luminous agent acts in the aggregate, the blackening should commence in the yellow region, because the yellow is the brightest space, and from this toward the extreme red in one direction, and the extreme violet in the other, the darkening should gradually decline, and beyond the limits of visibility should altogether cease, the chloride retaining its whiteness. But Scheele *found* that, instead of the action being at a maximum in the yellow as he had expected, the case was altogether different. The blackening began in the indigo or violet region, and extended in the more refrangible direction, far beyond the limits of visibility. In the other direction it stopped short in the blue space, so that the green, the yellow, the orange, and the red exhibited no kind of action. From this it would appear that a sunbeam does not darken the chloride of silver in virtue of its light, but that the decomposition is brought about by some other principle contained in the beam, conjoined with the light, and found to the greatest degree in the more refrangible end of the spectrum. To the rays thus recognized as occasioning the changes the designation of chemical rays was given, to distinguish them from the proper rays of light; and as it was subsequently discovered that the chemical operation commonly accomplished by them was one answering to deoxidation, they likewise received the epithet deoxidizing rays. These experiments of Scheele gather very great interest when compared with some made by Sir William Herschel, the astronomer, on the distribution of heat in the spectrum. In observations upon the sun with reflecting telescopes, he had been obliged to use colored glass screens, for the purpose of diminishing the excessive brilliancy of the light, and had accidentally noticed that the heat transmitted through these colored glasses was very far from being proportional to the light. A glass colored deeply enough to absorb a large portion of the *light* rays, might nevertheless transmit an unexpected proportion of the heat rays. He therefore prepared a solar spectrum after the manner of Newton, and set in each of its colored spaces the bulb of a delicate thermometer, expecting, as Scheele did in the parallel case of the chemical rays, that if the brightest ray was the most effective, the thermometer in the yellow space would stand highest, and in the others in a declining way toward each end of the spectrum. But he found that this was very far from being the case. Starting from the violet and descending through the indigo, the blue, green, yellow, orange, and red, the thermometer stood higher and higher; nay, even, what was altogether unexpected, outside of the red and beyond the visible limits of the light, the thermometer stood highest of all. No other interpretation could apparently be given to such an experiment than *that* the heat and the light are altogether independent agents, and distributed very differently in the spectrum. It is to be remarked that this conclusion contained, however, a most important error, which was perpetuated until a later period in these discoveries; it overlooked the physiological peculiarities of an organ of vision like the human eye. When these peculiarities were duly considered, it was perceived that this hypothesis of the physical independence of light and heat was very far from having been established by these experiments. Count Rumford made several ingenious experiments with a view of determining the mode of action of the sunlight in producing chemical changes, and came to the conclusion that it answered very closely to that which is observed in decompositions by heat at a very high temperature. But the first attempt at applying these principles photographically, that is, for the delineation of external forms, is to be attributed to Mr. Wedgwood, who by imbuing leather with a solution of nitrate of silver, and exposing it under the images of a magic lantern slide, succeeded in obtaining what would now be termed negatives. Sir Humphry Davy made some attempts of a similar kind; but as neither of these experimenters could fix the images they had thus obtained, their results were altogether abortive. But little was done from this time in the way of a systematic examination of the phenomena of the chemical rays until about 1835, when Dr. Draper commenced publishing in the "Journal of the Franklin Institute" a series of papers on the subject. The facts investigated were chiefly in connection with the influence of light upon crystallization, the effect of colored absorbing solutions upon the chemical rays, and the interference and polarization of these rays. In these experiments, bromide of silver, and other compounds much more sensitive to light than any that had hitherto been used, were resorted to. In 1839 popular attention was suddenly directed to the subject by the announcement in France of Daguerre's invention for the fixation of the images of the camera obscura, and simultaneously in England of that of Mr. Talbot. In the former of these the material employed was a metallic tablet of silver-plated copper, in the latter paper. With these inventions the art of photography properly speaking begins.—The process of Daguerre, as divulged to the French government in consequence of a pecuniary reward given to him, is as follows. A tablet of silver-plated copper is carefully cleaned, by means of pumice, rottenstone, or other suitable powders, from all adhering impurity, and is brought to a perfectly reflecting and mirror-like surface. The success of the subsequent operations turns upon the purity and perfection of this surface. The tablet is then exposed to the vapor of iodine, rising at the ordinary temperature of the air, and in succession it passes through a series of brilliant tints in the following order: pale lemon yellow, bright yellow, orange, red, blue, steel gray, clear metallic without color; then again yellow, red, &c., in the same order. Of these tints the first and second yellow are the most sensitive to light, the others comparatively sluggish. The plate is therefore only exposed until the first full yellow is reached, and then with a careful exclusion of light it is deposited in the camera obscura, so as to receive the image. Here it remains for a period dependent on the brightness of the light, the length of which the operator learns from experience. Screened from the chance access of light, it is now removed from the camera, and if it be critically examined in a dark room by the light of a feeble taper, not the slightest change or action of any kind is perceptible upon it. Nevertheless there is an image concealed, which may be easily evoked by exposing the plate to the vapor of mercury at a temperature of about 170° F. After such an exposure for 3 or 4 minutes, the picture comes forth, the camera image being reproduced nearly in its proper order of light and shade. This accomplished, it merely remains to dip the tablet in a solution of hyposulphite of soda, which instantly removes the yellow film or tarnish upon it; and after being copiously washed in clear water, the photograph is insensible to any further action of light. In this operation of Daguerre's there are therefore several successive stages: 1, the cleaning of the plate; 2, the iodizing; 3, the exposure in the camera; 4, mercurializing or development; 5, fixing. These are terms which became of current use in the art. It does not appear in what manner Daguerre first became acquainted with the relations of the iodized film to light and the vapor of mercury respectively. Probably it was the result of some chance observation in an attempt to blacken the silver by iodine, and to whiten it by mercurial vapor. As was seen from his first publication, he was altogether unacquainted with chemistry, and spoke of the decomposition of the elementary substances he was using as if it had actually taken place. By profession he was a painter of dioramas. He had been associated previously to this successful result with M. Niepce, in an attempt to obtain photographic images by the action of light upon resins and bitumens; and though it is said that the latter had carried his operation to such perfection that etchings of camera images had been procured, and even pictures printed from them, the operation was either so tedious or so doubtful that it never came into use.—Mr. Talbot's invention of the calotype or photogenic drawing, as he termed it, consisted essentially in covering a sheet of paper with a changeable salt of silver, exposing it in the camera, and developing the latent image by a solution of gallic acid. The result was a negative; that is, a photograph in which the lights and shadows answer respectively to the shadows and lights of the original; while in a positive the lights correspond to lights, and the shadows to shadows. It had this advantage over Daguerre's, that it was capable of multiplication; for from such a negative, if applied face downward on sensitive paper, many positive copies could be successively obtained by exposure to the sun. The daguerreotype, however, had a superiority unapproached even to this day by any other process; its images were exquisitely defined and sharp, and given with microscopic minuteness. The reason of this superiority is obvious. The daguerreotype is formed on a mathematical surface; the photograph in a translucent substance, in which the light can be diffused, and therefore the contours of objects are never optically sharp.—At first photography was limited to artificial views and interiors. It was found unsuited for the reproduction of landscapes, the green color necessarily predominating, which acts on the silver salts employed in a very sluggish way. The great and really valuable extension of its capabilities was that of taking portraits from the life. This is due to Dr. Draper of the university of New York, who succeeded in it very shortly after Daguerre's process became known in America, and who published the first complete account of it in the "London, Edinburgh, and Dublin Philosophical Magazine" of the following year. To so great a degree of perfection was this branch of the art immediately carried, that it is said that some of the portraits obtained by that chemist have not been since excelled. This great improvement was accomplished at a time when the inventor of the daguerreotype himself had given it up as impracticable. Two other improvements on the daguerreotype process were soon after discovered. The first consisted in more perfectly fixing the picture and deepening its shades, by the use of a salt of gold. This was due to M. Fizeau. The second consisted in the use of a much more sensitive preparation, the bromide of silver. This diminished the time of exposure in the camera to about one thirtieth part of what was formerly required. The original process was modified in the iodizing part, the tablet being first exposed to iodine until it became yellow, then to bromine vapor arising from bromide of lime until a faint rose red was reached, and then back again to iodine vapor for a few moments. The other stages of the operation were conducted without any modification. As was shown by Dr. Draper in the paper referred to, and others subsequently published in the "Philosophical Magazine," there is no iodine disengaged from the silver plate during the period of its exposure to light. The white portions of the resulting image consist of a compound of silver and mercury, a white amalgam of silver, while the shadows or dark parts are the pure silver unchanged. In an examination of some of these papers by Sir John Herschel, an opinion was expressed that the colors displayed by a daguerreotype plate, and the peculiarity of its images, depend on the thickness of the film which has been affected; but this opinion can scarcely be correct, since it is possible to copy a daguerreotype by electrotyping copper upon it, or even drying upon it a film of isinglass. The explanation given by Dr. Draper, that it is a dotted or stippled surface, the dots consisting of an amalgam of silver, is doubtless correct. To Sir John Herschel photography is greatly indebted, both as a science and as an art. He communicated several elaborate memoirs to the royal society, which were published in its "Transactions." These not only refer to the optical and chemical details of the subject, but also extend it to the case of new compounds, particularly the coloring materials of flowers and plants.—But the greatest improvement in the art of photography is due to Mr. F. Scott Archer of England, who discovered the collodion process. Of this the advantages are so great, that the daguerreotype and calotype processes have become almost obsolete. It consists essentially in coating a clean glass plate with a solution of gun cotton in alcohol and ether, containing some soluble iodide. Very commonly the iodide of ammonium is employed. After a momentary exposure to the air, the collodion is found adhering to the glass as a delicate film, the ether and alcohol having in part evaporated. The plate is now soaked in a solution of nitrate of silver, technically called the nitrate bath, in which there must have been previously dissolved as much iodide of silver as the solution will take up. Under these circumstances the iodide of ammonium in the film becomes iodide of silver. The glass is now transferred from the bath to the camera, enclosed in a suitable screen or shield to protect it from extraneous light. The exposure is then made as in daguerreotyping, and the invisible image is developed by pouring upon the film either a solution of pyrogallic acid or of protosulphate of iron. Too great activity in these substances is prevented by the previous addition of small quantities of acetic acid. The image comes forth as a negative, and it now remains to fix it. This is done by either soaking it in hyposulphite of soda, or pouring upon it a solution of cyanide of potassium; the film is then thoroughly washed with water and suffered to dry. From this negative proofs on paper may be printed, it having been first varnished with amber varnish or some other suitable material that will not soften in the sun. But if the solutions used in its preparation have been much weaker than is necessary for the production of such a negative, and the quantity of iodide of ammonium smaller, a positive on glass may be in the first instance obtained. Various names have been given to such positives, according to the manner of mounting them. Thus if the plate of glass bearing the image be joined to another plate by means of Canada balsam, and viewed against a black surface, it is designated an ambrotype. For the production of such positives a very much shorter period of time is required in the camera than for a negative. Sometimes, through inadequate exposure to light or a want of sensitiveness in the preparations, the result obtained as a negative is not sufficiently dense, and it becomes desirable to strengthen it in order to use it for printing. Various methods have been recommended for this intensifying, as it is termed, but by far the best hitherto published is that of Dr. Henry Draper, which simply consists in applying to the collodion picture before it is dry a solution of the protochloride of palladium. This instantly produces an inky blackness in the dark parts, and affects in like manner the shades in the order of their gradation. It imparts no stain nor impurity to the proof.—The operation of printing from a negative is thus conducted. Paper of very uniform consistency is coated on one side with a thin deposit of chloride of silver, conveniently produced by soaking the paper in chloride of ammonium or chloride of sodium, and then laying it on the surface of a solution of nitrate of silver. Thus prepared, the paper is placed beneath a varnished negative, and exposed to the sun. The light transmitted through the glass in its transparent parts produces blackness in the paper, but those places corresponding to the black portions of the negative remain white in the proof, the intermediate shades being of course intermediately affected. When the change has taken place to a sufficient extent, the paper is removed from beneath the negative and soaked in a solution of hyposulphite of soda. This dissolves out all the unaffected chloride of silver, and leaves the picture without any liability to further change. But as the tone or tint of color that it presents is commonly regarded as unpleasing to the eye, it is laid in a bath containing chloride of gold, which after a while imparts to it a delicate violet hue. Toning baths, as they are termed, of various ingredients, and capable of imparting shades of a sepia and brown tint, are recommended by different operators. They are too numerous to be here described.—The following formulas for the collodion process have been recommended: 1. For the collodion: gun cotton, 4 to 8 grains; sulphuric ether, sp. gr. .720, 5 fluid drachms; alcohol, sp. gr. .825, 3 fluid drachms; iodide of ammonium, 4 to 5 grains. 2. For the nitrate bath: water, 1 fluid ounce; nitrate of silver, 30 grains; as much iodide of silver as it will dissolve. 3. For the developer: water, 1 fluid ounce; pyrogallic acid, 1 grain; acetic acid, 10 to 20 minims. 4. Or this: water, 1 fluid ounce; protosulphate of iron, 12 to 20 grains; acetic acid, 20 minims. 5. For the fixing solution: water, 1 fluid ounce; cyanide of potassium, 2 to 20 grains. 6. For the fixing solution (another formula): water, 1 fluid ounce; hyposulphite of soda, ¼ ounce. The following formulas may be useful in the printing process: 7. For the salting solution: chloride of ammonium, 200 grains; water, 10 ounces. 8. For the sensitizing solution: nitrate of silver, 60 grains; water, 1 fluid ounce. 9. For the fixing solution: hyposulphite of soda, 4 ounces; water, 8 ounces. 10. For the toning solution: chloride of gold, 4 grains; hyposulphite of soda, 4 ounces; water, 8 ounces. If the paper previously to being sensitized has been imbued with albumen, the resulting proofs (albumen proofs, as they are termed) have a glossy and much improved appearance. It is of course to be understood that a print as well as the original collodion must be thoroughly washed in clear water after the process for fixing or toning has been completed; otherwise it will be liable to a spontaneous fading away.—Among the recent applications of photography must not be omitted the interesting one of the stereoscope. Stereoscopic photographs may either be made by a purposely constructed camera with a pair of lenses, or by a single camera set successively in two different determinate positions. The illusion of the stereoscope gathers force from the truth of the photograph, and such pictures, from the air of solidity that they present, give a very striking result, not only in the case of portraits from the life, but also in landscapes, and especially in architectural objects.—Though photographs as now produced by the best artists are of very great beauty, they are nevertheless very imperfect. They do not critically represent the exact order of light and shade; and what is a still greater defect, they do not represent the order of luminosity, as dependent upon the coloration of the object. To the eye the yellow is the brightest color, the intensity of the light declining as we go to the violet end of the spectrum on one side, and to the red on the other. But in all the silver preparations in use among photographers, the indigo ray produces the greatest effect, and therefore may be said to possess the greatest illuminating power, and from it the intensity declines toward the violet on one side, and ceases on the other before the yellow is reached. The effect of this in a photograph may be easily understood. If two pieces of paper, one painted light yellow and the other deep indigo, be examined by the eye, the former impresses us most vigorously, and we speak of it as being bright in comparison with the other. But if a photograph of these two pieces of paper be taken, the deep indigo will come out white, and the light yellow completely black. So the real order of their visual intensity is reversed in their photographic representation. It is for this reason that thus far photography has given such unsatisfactory results in its application to the delineation of landscapes.—Nothing would tend so quickly to the improvement of photography as the invention of some means for the accurate admeasurement of light; *i. e.*, some instrument that would answer for the luminous agent, as the thermometer answers for heat. Thus far the contrivances that have been recommended imply the conducting of an experiment rather than the making of an observation. Though they may answer well enough in the hands of an accomplished chemist, they are unsuitable for the common operator. Among them may be mentioned the galvano-photometer of M. Becquerel, and the chlorine and hydrogen photometer of Dr. Draper.—Owing to the want of durability of photographs obtained by the aid of salts of silver, attempts have been made to substitute for those compounds others not liable to change. Among such may be classed carbon, which is altogether unalterable in the air. But the carbon process, though not without merit, is very far from having reached a degree of perfection that would bring it into competition with the older methods.—From what has been said respecting visual impressions and photographic representations, it will be perceived that the agent which accomplishes the latter is not light, and that therefore the term photography is in truth a misnomer. Among those chemists who have examined the scientific connections of this subject, differences of opinion have prevailed respecting the relation between the principle thus involved and the luminous and calorific agencies. These differences of opinion have led to different designations for the rays darkening the silver preparations. Some of the earlier experimenters spoke of them as deoxidizing rays, some as chemical rays; others, in allusion to their position at the more refrangible end of the spectrum, as violet rays; others as tithonic rays; but the term that has met with most general acceptance is actinism or actinic rays (Gr. *ακτιν*, a sunbeam). This designation must however be considered as very inexpressive, and therefore ill chosen. On the undulatory theory of light, all these discussions and designations are needless. The essential difference in the colors of light lies in the differences of their wave lengths. The red, orange, yellow, green, blue, indigo, and violet arise from undulations that are smaller and smaller in the order of the colors as they are here named, and in such a proportion that the wave length of the first red light that the eye can perceive is exactly twice that of the last violet. The most brilliant part of the yellow stands intermediately between these limits, and has therefore a proportionate wave length of one and a half. From these facts it therefore follows, that waves of heat are greatest in their length and slowest in their time of vibration, and that as we ascend in succession through the visible spectrum, from its less to its more refrangible end, the wave length is diminishing, the rapidity of vibration increasing. The cause of any chemical decomposition by a ray is that the parts of the changing substance are thrown into movement by the impinging vibrations; and so long as those vibrations are too slow, the movement and therefore the decomposition cannot take place. But a certain rate of speed being reached, motion occurs and decomposition ensues, just as a stretched string may be made to vibrate sympathetically by a sound in unison with it. These explanations, though not so easily understood as those founded on the theory of the emission of light, possess a scientific advantage. The undulatory theory does not require an admission of many different coexisting principles, but accounts for all the facts by differences of movement in one homogeneous and universal ether.—From what has been said respecting the distribution of chemical rays in the solar spectrum, it will be understood that optical instruments for photographic purposes must be of the most perfect kind, and provided with the necessary means for depicting a perfect image of the objects to which they are directed. They must therefore be not only achromatic in the common acceptation of that term, but also achromatic photographically, and likewise have adequate provisions against spherical aberration.—The applications of photography have been so numerous, that it is now followed as an industrial pursuit in the United States and other countries by many thousands of persons. It also possesses a very extensive literature, from the highest scientific investigations, inserted in the transactions of various learned societies and special treatises in many instances of considerable size, to periodicals weekly, monthly, quarterly, and annual. Beside those who practise it professionally, it finds amateurs everywhere, sometimes among the most eminent personages. There is so much activity among its cultivators, that in the United States, England, France, and Germany, photographical societies are well sustained in many of the large towns. The general popularity which photography has thus attained is founded not only upon the realized perfection with which it can perpetuate external forms, but also upon the anticipated advantages hereafter to accrue from it in several of the higher departments of science. Already its application as a register of celestial phenomena indicates the benefits which it will result to astronomy. It has been employed for the purpose of permanently recording the aspect of the moon and the eclipses of the sun, and it only needs the use of some more sensitive material to enable it to give us representations of the planets, and even the configuration of the stars. To the microscope it has likewise been successfully applied, fixing the enormously magnified images presented by this instrument with a perfection and beauty altogether unattainable by the hand of man. In this manner questions of the utmost importance in physiology and the sciences of organization, which have long been in dispute, have received a final solution, and permanent representations have been obtained of transient phenomena occurring in living organisms. In meteorology likewise, a coil of sensitive paper receiving the shadow of the mercury in the thermometer or in the barometer, or of the suspended magnetic needle, or of the index of the wind gauge, supplies the place of an ever watchful observer, and gives us trustworthy records of the temperature and pressure of the air, of the variations in terrestrial magnetism, and of the motions of the atmosphere. But perhaps of all the sciences, botany is destined to be most dependent for its advances on discoveries connected with the chemical influences of light. The very growth of plants is determined by the yellow rays, and, as was proved by Dr. Gardner, their movements by the indigo rays. It is through the power of these that leaves and flowers offer themselves in a determinate direction toward the solar beams, bending round obstacles to present themselves most favorably to the light. Each of the colored and indeed each of the invisible rays seems to discharge a definite duty in the economy of plants.—On the fine arts the effect of photography has been important, and every day is increasing the number of its applications to artistic purposes. Soon after the discovery of the collodion process the facilities afforded by it for the multiplication of copies attracted the attention of publishers. Mr. G. P. Putnam of New York was the first to introduce it practically by the insertion of some photographic views in the "Homes of American Authors" (New York, 1854). In France and Germany many splendid books have been illustrated by the same method, as the superb memorial edition of Schiller now publishing with photographs from the original drawings of eminent living artists of Germany. For the representation of scenery or the copying of old paintings, drawings, &c., it is equally available; brilliant and well known specimens of its powers in those departments are Frith's "Scenery of Egypt and Palestine," Fenton's "Views in the Crimea," Raphael's cartoons, Rembrandt's etchings entirely reproduced by photography at Paris, &c. Its latest uses are for archæological purposes. The most ancient Greek MS. of the New Testament, discovered at Mount Sinai by Tischendorf, is now being photographed in 4 large volumes folio, at the expense of the emperor of Russia; and the British government is perpetuating by the same process the great Anglo-Norman record, the "Domesday Book." On the art of painting, the unlimited supply of photographic studies, combining breadth of effect with nature's own minuteness of detail, is producing the most marked results; while, should the progress of photography keep pace with its past achievements, many of the laborious and expensive enterprises of engraving on steel and copper will soon be entirely superseded. For instance, the publication of Kaulbach's illustrations of Shakespeare, begun in copperplate engravings (Berlin, 1856), is now continued in photographs.

PHOTOMETER. See Light, vol. x. p. 517, and Photography, vol. xiii. p. 290.

PHRENOLOGY (Gr. φρήν, mind, and λόγος, discourse), a system of philosophy of the human mind, founded on the physiology of the brain. As a system, it has its origin in the ideas and researches of Franz Joseph Gall, a German physician. First announced by him in 1796, it began to attract attention in England about the year 1815. It was first distinctly introduced into the United States through the labors of Dr. Charles Caldwell of Kentucky, who studied under Gall in Paris about 1820, and who, between 1821 and 1832, wrote and lectured on the subject, forming phrenological societies in New York, Philadelphia, and other large cities. The number of its adherents was small, however, and these mainly of the medical profession, until the period of Dr. Spurzheim's lectures, chiefly in Boston, in 1832, and the commencement of a series of lectures and cranioscopic examinations by the brothers O. S. and L. N. Fowler, in 1834. The lectures of Mr. George Combe in 1838–'40, in various cities from Boston to Washington, contributed much to the general and favorable introduction of the new system; and still more the "Constitution of Man" and other well known works of the brothers Combe. Since that period the number of the advocates of phrenology appears to have been greatly increased, though many of its principles, both theoretical and practical, are still under discussion.—Phrenology aims to be neither simply a science of mind nor a theory of the functions of the brain, but a system including the elements of both mind and brain, with their relations, and with consequent applications in respect to the development of the mental faculties, to the conduct of the individual and social life, to education, legislation, the arts, morals, and religion. Hence, its subject matter embraces, first, a theory of psychology, and secondly, an organology, or view of the relations of cerebral parts or organs to the mental faculties; this, again, being divisible into organology proper, and physiognomy in the broadest sense, or the knowing of the mental characteristics through signs, including cranioscopy (signs learned by examination of the cranium), temperaments, the features, and attitudes. It assumes that the value of all these, as signs of character, is based on a necessary correspondence, for every individual, first, between mind and brain, and secondly, between the brain on one hand, and other parts of the physical organization, as well as the habits and conduct, on the other. The belief in a plurality of mental faculties has been the rule in the various schemes of mental philosophy that have been proposed, though the number and nature of the faculties assumed have varied greatly. Again, our own consciousness, as well as observation, indicates the brain as the seat of the thinking principle; and while the intellect had usually been located in this organ, the sentiments and passions were more commonly, up to the time of Gall, supposed to reside in certain viscera, as the heart, liver, spleen, &c. Albertus Magnus, in the 13th century, divided the cranium into 3 regions, appropriating these, from before backward, to the Aristotelian faculties, judgment, imagination, and memory. Ludovico Dolce, in a work on the memory (Venice, 1562), drew a chart of 9 regions of the brain, answering to as many mental powers. Willis, and in 1784 Prochaska, especially advocated the doctrine of a division of the brain into organs of different mental faculties, though they did not attempt to localize such organs. The extreme diversity of natural talents early impressed the mind of Gall. His first special observation seems to have been that of a prominence of the eyes in all his schoolfellows who were noted for linguistic proficiency and memory of words. Following out the hints thus obtained, he arrived ultimately, as he believed, at the function and location of 27 organs of mental faculties, which he naturally enough named in view of their action, or in many instances of the extravagant and perverted action under which, in their extreme development, he often found them; hence, such terms as instinct of murder, vanity, &c. Of these all but one were retained by his pupil Spurzheim, who found reasons for including in one the two supposed powers of language; and who then added to the remaining number, first, by distinguishing in Gall's faculty of the "sense of things" the two powers of individuality and eventuality; and secondly, by discovering the office and seat of conscientiousness, hope, wonder, size, weight, time, order, and inhabitiveness. In Mr. G. Combe's enumeration, the last named faculty was replaced by concentrativeness; and he added the localities of love of life and alimentiveness, the probable existence of which had been admitted by Spurzheim. The latter set the example of naming the faculties with reference to their tranquil manifestation and supposed normal character; and in following out this principle he introduced an almost entirely new terminology. The names and order adopted by each of these writers appear in the subjoined tables; the figures following names in the second refer to the corresponding faculties in the first:

NOMENCLATURE OF GALL (translated).

1. Instinct of procreation.
2. Love of young, love of offspring.
3. Attachment, friendship.
4. Courage, quarrelsomeness.
5. Carnivorous instinct, murder.
6. Deceit, cunning, tact.
7. Sense of right of property.
8. Haughtiness, pride, *hauteur*.
9. Vanity, ambition, love of glory.
10. Cautiousness, foresight, circumspection.
11. Sense of things, educability, perfectibility.
12. Sense of place, sense of space.
13. Sense of persons.
14. Sense of words, sense of names.
15. Sense of relations of words.
16. Sense of colors.
17. Sense of tune.
18. Sense of relations of numbers.
19. Sense of mechanism, sense of building.
20. Sagacity in comparison.
21. Metaphysical talent, penetration.
22. Wit.
23. Poetic talent.
24. Good nature, compassion, benevolence.
25. Ability to imitate, mimicry.
26. Religious sentiment.
27. Firmness, constancy, perseverance.

[illegible] NOMENCLATURE OF SPURZHEIM.

I. PROPENSITIES.
1. Destructiveness (5)
2. Amativeness (1)
3. Philoprogenitiveness (2)
4. Adhesiveness (3)
5. Inhabitiveness.
6. Combativeness (4)
7. Secretiveness (6)
8. Acquisitiveness (7)
9. Constructiveness (19)

II. SENTIMENTS.
10. Cautiousness (10)
11. Approbativeness (9)
12. Self-esteem (8)
13. Benevolence (24)
14. Reverence (26)
15. Firmness (27)
16. Conscientiousness.
17. Hope.
18. Marvellousness.
19. Ideality (23)
20. Mirthfulness (22)
21. Imitation (25)

III. INTELLECTUAL FACULTIES.
(1.) *Perceptive.*
22. Individuality (11)
23. Form (13)
24. Size.
25. Weight.
26. Color. (16)
27. Locality. (12)
28. Order.
29. Calculation. (18)
30. Eventuality. (11)
31. Time.
32. Tune. (17)
33. Language. (14, 15)

(2.) *Reflective.*
34. Comparison. (20)
35. Causality. (21)

Probable Faculties.
Desire to live.
Alimentiveness.

The arrangement adopted in Combe's "System of Phrenology" (4th ed., Edinburgh 1836) is substantially as follows:

ORDER I. FEELINGS.

GENUS I. PROPENSITIES: 1, amativeness; 2, philoprogenitiveness; 3, concentrativeness; 4, adhesiveness; 5, combativeness; 6, destructiveness; alimentiveness; love of life; 7, secretiveness; 8, acquisitiveness; 9, constructiveness.

GENUS II. SENTIMENTS. (1.) Sentiments common to man and the lower animals: 10, self-esteem; 11, love of approbation; 12, cautiousness. (2.) Superior sentiments: 13, benevolence; 14, veneration; 15, firmness; 16, conscientiousness; 17, hope; 18, wonder; 19, ideality; 20, mirthfulness; 21, imitation.

ORDER II. INTELLECTUAL FACULTIES.

GENUS I. THE EXTERNAL SENSES.

GENUS II. PERCEPTIVE FACULTIES, noting existence of objects [omitted from 2d edition]: 22, individuality; 23, form; 24, size; 25, weight; 26, coloring.

GENUS III. PERCEPTIVE FACULTIES, noting obvious relations of objects: 27, locality; 28, number; 29, order; 30, eventuality; 31, time; 32, tune; 33, language.

GENUS IV. REFLECTIVE FACULTIES: 34, comparison; 35, causality.

Dr. Vimont, Robert Cox, J. T. Smith, and other trans-Atlantic writers, have criticized portions of both the scheme of faculties and the location of organs, and have proposed greater or less changes. The brothers Fowler admit still other faculties, increasing the number to 43; and they have changed again several of the names. The following is their most recent classification (1860) of the faculties and organs which they regard as ascertained (the definitions, for the sake of condensation, being slightly modified in some instances), the whole arranged in 4 groups of affective and 2 of intellectual faculties, as follows:

DIVISION I. AFFECTIVE FACULTIES.

(1.) DOMESTIC GROUP: 1, amativeness—the sexual instinct, or impulse; A, conjugality—the pairing instinct, exclusive love of one; 2, parental love—love of offspring, love of young, or of pets; 3, friendship—the gregarious or social impulse, attachment to friends; 4, inhabitiveness—love of home and country, desire to locate, patriotism; 5, continuity—persistence of emotion or of thought, application, absorption in one thing.

(2.) SELFISH GROUP: E, vitativeness—love and tenacity of life, dread of annihilation; 6, combativeness—impulse to resist and oppose, resoluteness, courage; 7, destructiveness—readiness to inflict pain, to destroy, or to exterminate, executiveness; 8, alimentiveness—appetite for food; F, bibativeness—fondness for water or other beverages; 9, acquisitiveness—desire to possess and own, impulse of getting and hoarding; 10, secretiveness—instinct of reserve and evasion, cunning, policy; 11, cautiousness—sense of danger or evil, desire of safety, watchfulness; 12, approbativeness—love of approval or of praise, love of display, sense of reputation, ambition; 13, self-esteem—sense of self-appreciation and self-respect, dignity, pride; 14, firmness—constancy of will and purpose, perseverance.

(3.) MORAL GROUP: 15, conscientiousness—sense of right and truth, feeling of justice and obligation, integrity; 16, hope—sense of and happiness in future good, anticipation; 17, spirituality—sense of the unseen, faith [love of the marvellous, credulity]; 18, veneration—sense of Deity, adoration, worship; 19, benevolence—desire of human well-being, love of others, self-sacrifice.

(4.) SELF-PERFECTING GROUP: 20, constructiveness—instinct of building, ability to combine or construct [synthesis?]; 21, ideality—sense of the beautiful and perfect, of the pure and elegant, imagination (?); B, sublimity—love of the vast and grand, sense of the infinite; 22, imitation—ability to pattern after, copy, or imitate; 23, mirthfulness—sense of the absurd or ridiculous, wit, humor.

DIVISION II. INTELLECTUAL FACULTIES.

(1.) PERCEPTIVE GROUP: 24, individuality—perception of things or individual objects, curiosity to see; 25, form—perception of shape, or configuration, including features; 26, size—perception of dimension or magnitude, and quantity generally, sense of space; 27, weight—perception of effort or pressure, of force and resistance, of gravity and equilibrium; 28, color—perception of hues, tints, lights and shades; 29, order—cognizance of arrangement, method, system; 30, calculation—cognizance of numbers, and their obvious relations; 31, locality—cognizance of place, and of situation; 32, eventuality—cognizance of events, occurrences, or facts; 33, time—cognizance of succession and duration; 34, tune—cognizance of melody and harmony; 35, language—cognizance and use of all signs of thought and feeling, words included, power of expression.

(2.) REFLECTIVE GROUP: 36, causality—cognizance of dependence, and of efficiency, or the relation of effect to cause; 37, comparison—cognizance of resemblances, of identity and difference, discriminating, power of analysis and of criticism; C, human nature—discernment of character and motive; D, agreeableness—suavity, ability to conform, and to be in sympathy with those about one.

It is not pretended that either the analysis or classification of the mental faculties has yet been satisfactorily accomplished. Dr. Caldwell appears not to have introduced any important changes into the classification or naming of the cerebral organs. Dr. J. R. Buchanan of Cincinnati has taught since 1842 a "System of Anthropology" (published at Cincinnati in 1854), which departs in many particulars from the received system; especially in subdividing the brain and increasing the number of faculties to a much greater extent, and in recognizing and claiming to localize, by the aid of certain assumed principles of impressibility, and chiefly in the under surfaces of the brain, faculties antagonistic to nearly or quite all those which may be termed the useful or noble—thus admitting regions of vice and crime, as well as of virtue and excellence, and supposing such positive elements of mind as hatred, antagonizing love; baseness, integrity; sensibility, hardihood; coarseness, ideality; servility, pride, &c. Dr. W. B. Powell, of Kentucky, has also proposed certain modifications of the scheme, claiming, among other things, to have established a threefold division in the cerebellum and its functions, namely, into: 1, a faculty of motion, including impulse to and regulation of muscular movements (a function specially insisted on by physiologists); 2, amativeness, as impulse merely; 3, the sensuous element or feeling, active in touch and in caressing. Dr. Carus, of Dresden, has published a "New Cranioscopy" (Stuttgart, 1841), in which he divides the brain into a small number of regions, rather than into organs. Mr. John S. Hittell has published (New York, 1857) a system of phrenology, which differs from that commonly received, chiefly in the rejection of such faculties as form, color, imitation, hope, acquisitiveness, &c., 17 in all, and many of which must be regarded as among the most clearly established in the catalogue. Among those in the United States who have become known for the advocacy or the popularizing of phrenological principles, should also be mentioned Mr. J. S. Grimes, Mr. D. P. Butler, Mr. Nelson Sizer, and Dr. Levi Reuben, the last of whom contends that, in a combination of the fruits of metaphysical study, furnishing as it were the physiology of mind, with a true scheme of elements, or anatomy of mind, phrenology can alone become a complete and satisfactory body of mental science.—Many of the received phrenological elements are allowed or anticipated by certain of the metaphysical writers; though, in respect of others, they diverge widely. As now developed, phrenology presents these leading priciples: 1, mind and body are in this life inseparable, a concrete *ego*, and must be investigated together; 2, the brain is the immediate organ of the mind, all the operations of the latter arising along with changes in the substance of the former; 3, the brain is a double organ, the halves of which can act singly, but usually do act together; 4, there are individually distinct mental elements, but bound together in a unitary consciousness, which recognizes all as of itself; 5, power of mind, or of any faculty, other things being equal, will be as the size of the brain, or of the corresponding organ; while among those other things, quality of organization and temperament, as well as states of health and disease, are of great importance. Among the leading proofs of the system are adduced the successive manifestations of inherent abilities in the same mind; the diversities of natural talents; the variety, partiality, and transmissibility of genius; and the phenomena of dreaming, of partial idiocy, monomania, and diseases and injuries of the head and brain. Whether the localities of the faculties in the brain have been properly found, is still an undecided question, especially in view of such facts as that, first, while we descend in the scale of vertebrates, it is the human, the moral and intellectual powers, that rapidly disappear, while at the same time the anterior lobes of the cerebrum remain until the last, and the posterior and then the middle lobes are the first to shrink and be obliterated; and secondly, no distinct separation of organs in the cerebral hemispheres, corresponding to the prominences on the cranium, have yet been made out. It is asserted, however, that strong confirmation of the Gallian system is found in the examination of crania of noted characters and of criminals, as well as of the skulls of animals; and extensive collections of these and other specimens have been made. That of Dr. Gall contained of human crania, &c., 354; the Edinburgh museum has 463 natural specimens, and 380 artificial, the former including crania of various nations. Mr. Deville of London accumulated 5,450 pieces, 2,450 human specimens, and 3,000 crania of animals; among the former were many of persons of marked peculiarity of character. (Edinburgh "Phrenological Journal," vol. xiv. p. 32.) The remark last made applies also to the collection of Messrs. Fowler and Wells of New York, which, though it has contributed largely to similar cabinets in Boston and Philadelphia, still numbers about 4,000 pieces, including about 300 human skulls, 200 of animals, 500 casts or busts, and 8,000 portraits and drawings. Dr. Vimont of Paris accompanied his memoir for the French institute (1827), among other specimens, with 2,500 crania of animals, of 1,500 of which he had studied the habits. Dr. S. G. Morton of Philadelphia had collected in 1841 above 1,000 crania, more than one half of which were human, of many nations, and supplying mainly the materials for his craniological works. Dr. Thomas Laycock has attempted to answer the question necessarily arising as to the mode of interaction of the faculties through the cerebral organs, by arguing that all nervous action, including the functions of the brain, is automatic. In its application, phrenology professes to find its ultimate results in a doctrine of psychology, and an art of reading character. Supposing the faculties chosen and the organs placed aright, the difficulties arising from unequal thickness of bones of the cranium, from unequal size of the frontal sinuses, &c., are minor and partial, though they must introduce a measure of uncertainty into the judgment obtained. Respecting the question of the tendency of phrenology to materialism, its advocates are divided; though the opinion that mind, as an organizing force, dominates in reality over the material conditions expressing it, has its firm supporters. But the system, if completely established, will, it is contended, carry with it a new educational, social, political, and theological science.

PHRYGIA, in ancient geography, a province of Asia Minor, whose boundaries varied materially in different stages of its history. Under the first Roman emperors it was bounded N. by Bithynia, E. by Galatia and Cappadocia, S. by Lycaonia, Pisidia, and Lycia, and W. by Caria, Lydia, and Mysia. In the 4th century the Romans divided it into two provinces, calling the eastern portion Phrygia Salutaris and the western Phrygia Pacatiana. Before the invasion of Asia Minor by the Gauls it extended as far E. as the river Halys. Most of the larger cities were situated in the S. W. part of the province; the most important were Celænæ at the source of the Mæander, famed for the mythical contest between Apollo and Marsyas; Apamea Cibotus, founded by Antiochus Soter; Colossæ, where a Christian church was established, to which St. Paul addressed an epistle; Laodicea, the seat of another Christian church; Hierapolis, renowned for its mineral springs; and nearer the centre of the province was Docimeum, the marble of which was in high repute. The principal rivers were the Mæander in the W. and the Sangarius on the

N. boundary. The country is a high table-land, the soil in the N. and W. being fertile, but covered with salt marshes and lakes in the S.—The Phrygians were regarded as one of the most ancient nations of Asia Minor, the most contradictory opinions existing in reference to their origin. By some they were considered as Thracians, by others as Armenians. In early times they seem to have been governed by kings of their own. They were conquered by Crœsus, king of Lydia, and along with the rest of his dominions became a part of the Persian empire, in which it was included in the third satrapy. After the overthrow of that empire by Alexander, Phrygia fell into the hands of Antigonus, and after his death it formed a portion of the Syrian empire founded by Seleucus. Afterward the territories of Phrygia were circumscribed by the formation of Galatia and the extension westward of Lycaonia. When Antiochus the Great was defeated by the Romans at Magnesia in 190 B. C., Phrygia was given to Eumenes II. of Pergamus. In 133 B. C. it fell into the hands of the Romans, and, with the exception of a few years when it belonged to Pontus, remained a part of their empire. It now forms a part of the Turkish empire.—A country called Lesser Phrygia is described by the ancients; and although its boundaries are not distinctly defined, it seems to have extended along the Hellespont, and to have been included in Mysia.

PHRYNE, an Athenian *hetaira* or courtesan, of the latter part of the 4th century B. C., born in Thespiæ, Bœotia. She was of low origin, and originally gained a livelihood by gathering capers; but she found the traffic in her charms more profitable, and by this means acquired so much wealth that, after Alexander destroyed the walls of Thebes, she offered to rebuild them, if she could be permitted to put up the following inscription: "Alexander destroyed them, but Phryne the courtesan rebuilt them." Among her lovers were some of the most distinguished men of the age of Alexander. When she was accused of atheism, the orator Hyperides secured her acquittal by unveiling her bosom before the assembly. Praxiteles modelled from her the Cnidian Venus, and the picture of Apelles called "Venus Anadyomene" is said to have been taken from Phryne. She once wagered that she could subdue the virtue of Xenocrates, but failing in the attempt declared that he was not a man but a statue. She had lovers late in life, as it was deemed an honor for any one to bear that title.

PHTHISIS. See CONSUMPTION.

PHTHEIRIASIS. See EPIZOA, vol. vii. p. 254.

PHUXUAN. See HUÉ.

PHYLACTERY (Gr. φυλακτήριον, from φυλάσσειν, to guard), a name given to any amulet or charm worn by the ancients to guard them against danger and disease, or, as among the Hebrews, against transgression. Among the latter it was a strip of parchment, upon which were written passages from the Scriptures, and which, folded up and placed in a small leather box, was worn by the devout principally on the forehead. As used among the modern Jews, they are attached to the head, to the arm, and to the door posts. Very fine vellum is employed, and the writing traced with great care, while the case in which they are enclosed is made of several layers of parchment or of black calfskin. According to Lightfoot, the Saviour did not condemn the wearing of phylacteries, but the widening of them so as to gain a reputation for piety.—Among the early Christians, a phylactery was often used as an amulet, a practice forbidden by the council of Laodicea.

PHYSICAL GEOGRAPHY, that department of the science of geography which treats of the physical condition of the earth, describing its character and relations as one of the members of the solar system, explaining its great natural divisions of land and water, the atmosphere which covers them all, and the great movements, as of oceanic and aërial currents, which are ever going on, variously affecting and modifying these features. The forms of continents and oceans and of all their subdivisions, the heights and ranges of mountains, the phenomena of deserts and plains, and all the varying outlines from the highest mountain summits to the lowest depths of the sea, are among the first objects of its consideration. The geological structure of the earth and the meteorological phenomena of rain, fog, dew, hail, frost, &c., belong to the broad field of its investigations; which moreover comprises the natural products of the earth, vegetable and animal. But wide and comprehensive as is the range of this science, it enters not into individual descriptions of phenomena, localities, and species, but is concerned chiefly with general laws and principles, as they are manifested upon a grand scale, and in the organic kingdom with the existence of races and their distribution in certain zones of habitation or stations. The relations and adaptations of organic and inorganic nature to each other are specially treated in this science alone. Its ultimate aim, as stated by Humboldt in his *Kosmos*, the work which first gave to physical geography a place among the sciences, "is to recognize unity in the vast diversity of phenomena, and by the exercise of thought and the combination of observations to discern the constancy of phenomena in the midst of apparent changes."—The first writers on physical geography were among the earliest geographers and writers on physical science, referred to in the articles EARTH and GEOLOGY. The broad views advanced by Aristotle, Strabo, Pythagoras, and others of the ancient philosophers, entitle them to be regarded as the first cultivators of this science. In modern times its principles were treated with great originality and ability by the Jesuit José de Acosta, in his *Historia natural de las Indias* (1590). In 1650 was published the first edition of the work of Varenius, entitled *Geographia Generalis, in qua Affectiones Generales Telluris explicantur*, which, Humboldt says, "in the true sense of the words, is a physical description of the earth." A part of this the author styled *Geographia Comparativa*, which is the term now generally applied to works on physical geography; and the leading subjects discussed by him are those of the most recent treatises. The great advance made of late years in the auxiliary sciences furnished materials for more extended generalizations and a more complete "delineation of comparative geography, which was drawn to its full extent, and in all its relations with the history of man, by the skilful hand of Carl Ritter" in his *Erdkunde im Verhältniss zur Natur und zur Geschichte des Menschen, oder allgemeine vergleichende Geographie* ("Geography in relation to Nature and the History of Man, or general Comparative Geography"). The principles of the science were ably illustrated in the "Physical Atlas" of Alexander Keith Johnston, first published in 1848; and they have been expounded in the writings of Sir John Herschel, Mrs. Somerville, Arnold Guyot, and numerous other physicists, some of the most valuable contributions of whom came from those devoted to one or a few special departments of the science, as geology, meteorology, &c., and also from the most distinguished among modern travellers and explorers. In this cyclopædia the topics connected with this science are treated under their own separate heads, as CLOUDS, DEW, HAIL, HURRICANE, MOUNTAINS, as also under the more general heads of EARTH, GEOLOGY, METEOROLOGY, &c.

PHYSICIAN AND SURGEON. In all rude nations priests are the physicians, and this was the case among the Egyptians and Greeks, as it is now among the American Indians. In Greece, however, medicine early rose to the rank of a distinct science, and its practitioners were highly honored and well remunerated, although there appears to have been an inferior body of practitioners, the slaves of physicians, who practised on men of their own degree. In the earlier days of Rome, medicine, like all the liberal arts, was despised, and its practice was confined to slaves and persons of inferior station; and it was only after Grecian arts and letters were cultivated at Rome that physicians obtained a more honorable standing. The first Cæsar gave medical men practising at Rome the honors of citizenship. Augustus, having been cured of a dangerous illness by Antonius Musa, raised him to the rank of *eques* or knight, and in his honor exempted physicians in future from taxation. The Roman armies during the empire were attended by regular surgeons, and many of the stamps with which they sealed their preparations have been found in England and on the continent. While the science of medicine was thus rising in honor and importance, it was long before any guaranty that a physician was competent to exercise his profession was required by law. It was under the Christian emperors probably that physicians were first required to undergo an examination by competent persons before they were permitted to practise. There were two kinds of archiaters; the first were attached to the household of the emperor, while the second formed in every city a kind of college charged with the care of the public health. They examined all who desired to practise, and licensed them if competent; if any practised without such license, they were heavily fined. These archiaters were paid by the state and attended the poor gratuitously. Under the Christian emperors too, about the year 400, we first find mention of a class similar to our apothecaries. Previously physicians either prepared their medicaments themselves, or had them prepared by their pupils or servants.—In the general barbarism following the fall of the Roman empire, medicine as a science was completely lost, and the estimation and rewards of those who practised it must have depended upon their own good fortune and the rank of their patients. Internal medicine gradually came to be practised exclusively by the clergy; and, as they were forbidden to shed blood, operative surgery fell into the hands of an inferior class. In this manner rose the fraternity of barber surgeons. Still in France a small number of lay surgeons, under the title of the surgical college of St. Cosmas and St. Damian, carried on an obstinate struggle on the one hand with the faculty of medicine and on the other with the barber surgeons and the bone setters. During the middle ages indeed the general practice of surgery was reduced to the lowest ebb. In Germany, according to Sprengel, no artisan took a young man as apprentice without an attestation that he was born in marriage of honest parents, and came of a family in which were found neither barbers, bathers, nor skinners; yet these last were the only surgeons of most of the German towns. Very gradually a better state of things arose in the large cities, the barber surgeons acquiring knowledge and skill in the school of experience. The progress of anatomy had its influence on surgery. In 1515 the college of St. Cosmas was united with the university, and thenceforth the barbers before they could exercise surgery were examined by a physician and two surgeons of the king. Thus gradually the contempt with which they were regarded gave way before their increased attainments and their importance to the community. In France medicine, after having long been separated from surgery, was reunited to it in 1795, upon the reorganization of the medical schools. In England, on the other hand, the surgeons, incorporated with the barbers in the time of Henry VIII., only received a separate charter in 1745, and the two colleges of physicians and surgeons remain perfectly distinct. Most of the universities however throughout the world, like the Paris school, give a common degree of doctor of medicine and surgery.

—In undertaking the treatment of a patient, the physician enters into a legal obligation and assumes legal liabilities, which, though seldom expressly defined, are yet, in the apprehension of the law, fixed and certain. The law holds that he contracts for the possession of that reasonable degree of learning, skill, and experience which the members of his profession ordinarily possess. Those also who, like oculists, aurists, or dentists, claim to be particularly conversant with and skilful in the treatment of the diseases of single organs, must be held to a peculiar responsibility. The same is true of physicians of great pretensions in large cities as compared with those residing in remote and thinly settled districts. In undertaking a case, the physician also contracts that he will apply the skill which he possesses, whatever be its degree, with reasonable and ordinary diligence and care. Extraordinary care is no more implied than extraordinary skill; nor is the practitioner supposed to guarantee a cure, though he may if he chooses contract to effect a cure, and then he must answer for a failure. The physician's skill in a given case will ordinarily be required to embrace those phases and phenomena which usually characterize the dominant disease; and any mischance which connects itself immediately with these will involve the question of skill. His diligence and care will be exercised in watching for and guarding against the numerous accidental influences which, if overlooked, may delay or even prevent the restoration of the patient, such as latent predispositions to certain diseases; a lack of vital or recuperative power in the patient; the effects of melancholy and of other passions of the mind; the effect of the want of pure air and good food, of careful attendance and nursing; the neglect of the patient to follow the physician's advice or to take the medicines which he prescribes. If he have brought ordinary skill and care to the treatment of his case, the physician is not responsible for want of success nor for mistakes in cases of real doubt and uncertainty. The same is probably true of errors of judgment; though there is a late case in the Maine reports, where a verdict of heavy damages against a physician for alleged malpractice in a case of amputation was sustained on appeal, though the court expressly admitted that the verdict was found against the defendant on the ground of his error of judgment in not removing more than he did of the amputated limb. The physician's liability in cases of malpractice is ordinarily only a civil one, and the injury he does can usually be compensated by damages. But, in cases where death has followed the treatment, and it has seemed to be the direct consequence of the treatment, there have been, not unfrequently, charges of criminal malpractice preferred against the medical practitioner. To constitute a crime, there must be a malicious or criminal intent. This intent may exist in an actual design, or the law will infer it from gross rashness or want of circumspection.—Where no statutory prohibition intervenes, all regular and irregular practitioners are to be placed on the same footing. Leaving out of consideration cases of express malice, which would hardly be included under the designation of malpractice, our topic is reduced to those cases in which the charge is founded upon gross ignorance, gross negligence, or gross rashness. With particular reference to the charge of manslaughter, the law, especially in England, is that "if one, whether a medical man or not, profess to deal with the life or health of another, he is bound to use competent skill and sufficient attention; and if he cause the death of the other through a gross want of either of these, he will be guilty of manslaughter;" or as an eminent American authority, Mr. Bishop, states the law: "The carelessness in a medical man which, if death follow, will render him liable for manslaughter, is gross carelessness, or, as it is more strongly expressed, the grossest ignorance or most criminal inattention."—Criminal malpractice in relation to infanticide is considered under the title Pregnancy.

PHYSICK, Philip Syng, an American physician and surgeon, born in Philadelphia, July 7, 1768, died there, Dec. 15, 1837. He was graduated at the university of Pennsylvania in 1785, afterward studied medicine, and in 1788 went to London, where he became the private pupil of John Hunter. In 1790 he was admitted as house surgeon to St. George's hospital; and after residing for a year at Edinburgh, he returned in 1792 to Philadelphia, and there began the practice of medicine. In 1805 he was appointed professor of surgery in the university of Pennsylvania, in 1819 was transferred to the chair of anatomy, and in 1824 was elected president of the Philadelphia medical society. He wrote for medical journals accounts of cases he had treated, or of processes or instruments he had invented. He has been called the father of American surgery.

PHYSICS. See Natural Philosophy.

PHYSIOGNOMY (Gr. φύσις, nature, and γνῶναι, to know), the name given to the human countenance as indicative of the character, or to the art or science of discerning the character by the cast of the features. The claim of physiognomy to be considered a science rests upon the assumption that the habitual exercise of any feeling will leave upon the face a certain impression by enlarging, strengthening, and rendering permanent in position the muscles associated with such emotions. Thus to a certain extent every man is a believer in the science, because every man forms some opinion of those he sees, especially for the first time, by the expression of their countenances. The first elaborate attempt to elevate physiognomy to the rank of a science was made by Lavater in 1775–'8; but no special application can be made of the general rules he has furnished, on account of the number of exceptional cases arising from accidents of education, from the transmission of features from parents to children without the transmission of disposition, and from various other circumstances. Beside Lavater, others have written on the same subject, as Spurzheim in his "Phrenology in connection with Physiognomy" (Boston, 1834), and J. Cross, author of "An Attempt to establish Physiognomy upon Scientific Principles" (Glasgow, 1817).

PHYSIOLOGY (Gr. φυσις, nature, and λογος, doctrine), strictly speaking, the doctrine of nature, embracing a knowledge of all the physical and natural sciences, but now restricted to the science which treats of the vital actions peculiar to organized bodies, whether animal or vegetable; including histology, which treats of the elementary tissues as distinct from the organs which they compose, but excluding pathology, which concerns the vital functions in a state of disease. These distinctions, however, are arbitrary, as physiology cannot be dissociated from histology, nor be separated by a definite line from pathology, since it is impossible to determine exactly where health terminates and disease begins; some writers use the term biology, as comprehending the doctrine of life, whether in health or disease. Comparative physiology discusses the phenomena of life throughout the whole chain of beings, their differences and relations; physiology is general, special, or human, according as it takes up the subject in an abstract manner, as applied to a single species, or to man.—Living beings may be distinguished from inorganic matter by the peculiar arrangement of their heterogeneous parts, solid and fluid, mutually acting upon each other, by their definite form, and determinate bulk; by their origin from parents in the form of germs; by their powers of drawing sustenance from the external world, of excretion, and of growth; and by the phenomena of disease. In eggs and seeds the vital properties exist, though in a dormant state. Even presupposing the existence of organized structure, it is impossible to give a precise definition of life. The ancients held to the opinion that there is an independent entity or vital principle, whose union with the body causes life and its separation from it death. The moderns, however, regard life as a series of phenomena in organized beings, dependent partly on structure and chemical composition, whose various properties are brought into play by external stimuli. According to Bichat, "life is the sum total of the functions which resist death;" Treviranus makes it "the constant uniformity of phenomena with diversity of external influences;" and Beclard calls it "organization in action." Physiology, therefore, presupposes a knowledge of the structure of the tissues (whether molecules, cells, fibres, or tubes), and their properties and natural stimuli, including organic chemistry, and must be the basis of all just conclusions in pathology, therapeutics, and hygiene, whose avowed principles and practice are always the reflections of the physiological ideas of an age.—The theories of the principle of life may be divided into 3 groups: 1, those which consider the body an inert mass, into which an animating principle, called by various names, has been introduced; 2, in which life is explained by physical laws; 3, which recognize special vital properties or a vital force. In the 1st belongs the ancient theory of animism, according to which the world is vivified by a soul or spirit everywhere diffused, a portion of which gives life to man, animals, and plants. The ancient philosophers compared the human microcosm to the macrocosm of the universe, and recognized the same motor forces for organic and inorganic matter. Hippocrates considered unintelligent nature as the mysterious agent in the vital processes. Plato and Aristotle admitted 3 animating spirits, the vegetative in the plant, the vegetative and sensitive in the animal, and in man an additional intelligent and reasoning spirit, nobler and purer than the others. Paracelsus, in the 16th century, pretended to explain the functions of life by chemical and cabalistic arts, attributing to sidereal spirits and the planets a direct action upon the body, the sun upon the heart, the moon upon the brain, &c. Van Helmont afterward personified the vital principle under the name of *archæus*, a name previously employed by Paracelsus; this power was situated at the cardiac orifice of the stomach, and presided directly over digestion by the agency of the gastric juice; the *pylorus*, another dignitary of the organism, the doorkeeper of the stomach, opened or shut the passage into the intestine under its control; this duumvirate had its subordinates in each organ, which executed the special orders; health reigned during the peaceful and orderly state of the *archæus*, but its anger, fright, or irregularity produced diseases—an allegory under which we perceive the dimly shadowed idea of the sympathy and mutual dependence of organs now universally recognized; by the aid of a chemical ferment the *archæus* could organize matter directly, without the intervention of an egg. Stahl, early in the 18th century, though educated in the chemical school of physiology, found so many vital phenomena inexplicable by physical laws, that he sought for a new basis for the physiological edifice; insisting on the inertia of matter, organization to him was nothing without the rational soul, at the same time that the latter could do nothing without the body which was created for it; all physiological acts were established and directed by the soul in order to preserve the integrity of the body, by which it is brought into relation with the external world; most of the functions were destined to prevent the decomposition of the soft solids and liquids of the body, and all the movements were voluntary. Descartes, early in the 17th century, put an end to the theory of Van Helmont's *archæi*; notwithstanding the immense power he attributed to the soul, this philosopher's theories led to the establishment of the chemical and mechanical schools of physiology; he favored the former by introducing ferments, acidity, alkalinity, and effervescence of the humors, among the nutritive functions; and he influenced the latter by explaining the secretions by the round, cubic, or pyramidal forms of the molecules, and the functions of relation by a vibratory movement excited in the nerves by external impressions, propagated to the pineal gland in the brain, and terminating in the cerebral fibres on which it left material traces. Sylvius of Leyden, in the last half of the 17th century, explained all the functions of the body by the effervescence and fermentation of the fluids, excluding entirely the solids from his physiological scheme; food fermented in the stomach under the influence of the gastric fluids, and digestion was perfected by the actions established by the addition of the bile and the pancreatic secretion; the movement of the blood in the heart was due to the effervescence arising from the meeting of an oily volatile salt of the bile with a saccharine acid of the lymph, producing at the same time the animal heat; the vital spirits, entirely material, were prepared in the brain by distillation, having much of the properties and nature of alcohol; all diseases were caused by the predominance of this or that chemical element in the fluids, and to counteract a supposed acidity very powerful chemical preparations were rashly administered. While Sylvius taught these doctrines upon the continent, Willis promulgated similar ones in Great Britain; he made also the chyle effervesce in the heart under the influence of salt and sulphur, which took fire together and produced the vital flame. According to Haller, even the great mind of Newton was led astray by such vagaries as these. Many of the popular ideas of peccant humors, for which a multitude of empirical remedies are continually extolled and exhibited, date back to the chemical theories of the 17th century. Boerhaave and his school, early in the 18th century, substituted mechanical for chemical forces in physiology, explaining the phenomena of life on the principles of mechanics and mathematics according to the idea of Descartes; the then admitted doctrine of Harvey of the circulation of the blood and the discoveries of Galileo favored the progress of this school. Food was reduced in the stomach to minute particles by trituration; the circulation was a complete hydraulic machine, and the heart a perfect sucking and forcing pump; the weight of the blood and the loss of its motive power from friction in the vessels were exactly calculated, and the force of the heart's contraction estimated at 180,000 lbs.; the differences in the secretions were explained by the diameter, foldings, and number of the divisions of the vessels in the secreting organs, and by the diverse forms of the molecules, some of which were admitted and others excluded by these kinds of organic sieves; animal heat was the result of the friction of the blood globules against each other and against the walls of the minute vessels. Electricity was at one time considered the active agent of the vital functions, and certain analogies indeed favored this view; electricity dethroned the vital principle, and the barrier erected with so much labor between living and inorganic bodies was again thrown down. Glisson, in England, toward the middle of the 17th century, while the physical theories of life were in vogue, seems to have been the first to shed light on the path in which modern physiology has since so rapidly advanced; he maintained the activity of matter, and that all the functions of life depend on a property of living animal substance which he calls irritability, entirely independent of physical or mechanical forces—all parts of the body, even the bones and the fluids, possessing this property. This theory was completely forgotten until toward the middle of the 18th century, when various authors made use of the terms contractile force and tonicity. Haller (1747) admitted two properties, irritability and sensibility (*vis insita* and *vis nervea*); his irritability is the property of contracting under stimuli (the will for the ordinary muscles and their contents for the hollow ones), now styled contractility, distinct from and more powerful than elasticity, independent of the nervous force, and improperly called vital inasmuch as it is manifested after death; his sensibility is the power of perceiving the impressions derived from contact. This theory gave a great impulse to physiological science, which before this was in a very confused state. Barthez, in the last half of the 18th century, adopted the phrase vital principle, which he regarded as distinct from the soul, and as having its own proper existence and its motor and sensitive forces, the former residing in the muscles, the latter in the fluids and especially in the blood; this system met with great favor. Bichat, a quarter of a century later, reduced the vital properties to two, contractility and sensibility, each divided into the animal or voluntary and the organic. Brown, a few years before this, had elevated the property of incitability in the tissues into the vital principle; according to him, all diseases are either sthenic or asthenic, the vital force being increased in the former and diminished in the latter; this doctrine gave rise to the contra-stimulant practice of Rasori and others. Blumenbach, toward the end of the 18th century, attributed all the formative actions to a force which he called *nisus formativus*. Broussais, early in the 19th century, made pathology a branch of physiology, and gave to his system the name of physiological doctrine of disease; his celebrated theory placed essential fevers among the inflammations of the digestive tube, as forms of gastro-enteritis. Gerdy admits 17 vital principles, or so many distinct series of phenomena inexplicable by physical laws, a list which on his principles might be very greatly and inconveniently au-tended.—Modern physiology, as illustrated by Tiedemann and Gmelin, Burdach, Müller, Wagner, Bérard, Carpenter, and Todd and Bowman, recognizes that many of the changes which take place in the living body are effected by the same forces which act in the inorganic world and out of the body; but beside these chemical, mechanical, and electrical forces, there remains a principle peculiar to life, or the properties inherent in the various forms of organized structure—as much a part of them, and equally inexplicable, as are gravitation, magnetism, and electricity, properties inseparable from inorganic matter. The harmony and mutual adaptation of the phenomena within living organisms, as well as those manifested in the external universe, must alike be attributed to the infinite wisdom and power of the divine mind. The term "vital principle" should not be understood as intimating the existence of a separate and unknown cause of life, like the animism of the old writers, but be used simply as a convenient expression for "the sum total of the powers which are developed by the action of the vital properties of organized structures," stimulating instead of checking inquiry into their causes. Life, which it is the province of physiology to study and explain, involves the idea of constant change in the tissues composing an organism; the vital actions of the parts of a living body are mutually dependent on each other, and all are harmonious, during health, in the maintenance of the life of the organism as a whole. These actions are associated into groups called functions, which concur in effecting certain purposes, such as respiration and circulation. These functions may be divided into the organic or vegetative and the animal, according as they are concerned in the development and maintenance of the body, or render the individual a conscious and moving being; in the former belong those of digestion, absorption, assimilation, circulation, nutrition, respiration, secretion, and reproduction; in the latter those of sensation and motion. Though the organic, animal, and reproductive functions are intimately blended in the higher animals, as we descend the scale the animal or nervous functions gradually disappear (first mind, then voluntary motion, and finally sensation), until in the simplest animalcules we find nothing but an absorbing membrane capable of reproduction. To show at a glance the scope of physiological science, the following brief notice will be serviceable: A. The functions of the animal or intellectual life are concerned in establishing the relations of animals and man with surrounding objects; they constitute essentially man as a moral being, suppose an intellectual principle, and their organs are symmetrical and correspond by means of nerves with a central brain; this life is subjected to the law of sleep, is influenced by habit, begins with birth, and becomes gradually extinct with age; these functions are sensations (vision, hearing, touch, smell, and taste), the intellectual faculties, emotions, the will, voluntary motion, and sleep or the rest of the nervous and muscular systems. B. The functions of organic life have for their object the nutrition of the organs; most of their organs are of irregular shape, do not communicate with the brain, are independent of the will, and act without interruption from the moment of conception until death; they are digestion, absorption (lymphatic and venous), circulation, respiration, exhalation, secretion, and reproduction (with the secretions of sperm and milk, and the phenomena of menstruation, conception, and gestation).—The functions concerned in these vital processes will be found treated under Absorption, Abstinence, Adipose, Age, Aliment, Animal, Animal Electricity, Animal Heat, Anthropology, Bile, Blood, Bone, Brain, Capillary Vessels, Cartilage, Cell, Chyle, Chyme, Circulation, Comparative Anatomy, Dentition, Dietetics, Digestion, Embryology, Gland, Heart, Histology, Hunger, Kidney, Liver, Lungs, Lymph, Muscle, Nervous System, Nutrition, Perspiration, Respiration, Secretion, Skin, Voice, &c. Beside the authors above named, reference may be made to the writings of Adelon, Sir Charles Bell, Bernard, Brown-Séquard, Flourens, Liebig, Longet, Magendie, Marshall Hall, Matteucci, Paget, Richerand, Roget, Rudolphi, Serres, Simon, Valentin, Verdeil, and Robin, in Europe; and in America to those of Dalton, Draper, Dunglison, and Paine, with the numerous references therein named.

PIACENZA (anc. *Placentia*), a city of Italy, capital of the former duchy of Parma and of a province of the same name, situated in an extensive and fertile plain on the right bank of the Po, about 2 m. E. from its junction with the Trebia, and nearly equidistant from Parma and Milan; pop. 31,403. It is fortified by a citadel and old earthern ramparts and ditches. It has a cathedral, built in the 12th century, and other churches; a *podesteria* or town house; a library of 30,000 volumes, &c. Cotton, silk, firearms, &c., are manufactured.—Placentia became in 219 B. C. the seat of a Roman colony, and the next year the battle of the Trebia between Hannibal and Sempronius was fought in its neighborhood. It remained faithful to Rome at a later period of the war, and withstood a protracted siege by Hasdrubal, but in 200 B. C. it was captured by the Gauls. The Æmilian way, constructed not many years after, originally terminated at Placentia. In the war between Marius and Sylla, Lucullus, the general of the latter, defeated the partisans of Carbo in 82 B. C. in its vicinity; and here also the mutiny in Cæsar's camp broke out during the war between him and Pompey. During the empire Placentia seems to have been one of the most flourishing towns of Gallia Cispadana, and the desolation which overtook the whole of that province in the barbarian irruption did not entirely destroy its importance. In 1126 it became an independent republic, and in 1254 subject to lords of the families of Pallavicino, Scotti, and Landi, and subsequently to the Visconti of Milan. In 1447 it revolted, but was retaken the same year by the Milanese under the command of Francesco Sforza. In 1512, after the battle of Ravenna, it came into the hands of the popes, and in 1545 Paul III. presented it to his son Pietro Luigi Farnese, along with the duchy of Parma, of which from that time it formed a part. In June, 1799, the French were defeated near it by Suwaroff. In 1860 it was annexed to the kingdom of Sardinia.

PIACENZA, Duke of. See Lebrun, Charles François.

PIANOFORTE (Ital. *piano*, soft, and *forte*, loud), a musical instrument, the tones of which are elicited by means of the blows of small hammers upon a series of tightly stretched elastic strings; the hammers being caused, through certain connections, to rise upon striking the corresponding keys of a finger board, and the tones being strengthened and rendered melodious by the reciprocal vibrations of a properly prepared sounding board, over and near to which the strings are stretched. In his recent history of the pianoforte, Dr. Rimbault traces the first principle of the instrument, the stretched string, to the ancient lyre; and from this he shows a course of gradual modification through the forms of the harp, the psaltery, the dulcimer, &c. The first marked approach to the pianoforte appears in the transition from the dulcimer to the clavicitherium (keyed cithara), which was a small oblong box, holding a series of strings in triangle form, and struck by *plectra* of quill attached to the inner ends of the keys. This application of the keyboard to stringed instruments is believed to have been first made in the 12th century. Next followed the clavichord, which continued in favor for about 6 centuries, though in part giving place to varieties known as the cymbal and manichord. It is remarkable that the damper, a contrivance allowed to fall or rest upon the string, so as to arrest its vibration when the key has been released by the finger, was introduced at an early period into the clavichord. An improvement upon the keyed cithara, called the virginal, was very popular with Queen Elizabeth and ladies of her time. In this the strings, of catgut, were at once struck and pulled by pieces of quill fixed in the upper end of short, upright jacks upon the inner ends of the keys. The spinet, of about the same period (1500–1700), was a larger box of triangular form, having sometimes 49 strings, some of steel wire, and also played on by means of a jack and quill (spina). The body of the so called square pianoforte, which is oblong in form, is evidently copied from that of the clavichord; while the almost triangular arrangement of the strings as clearly has its origin in the form assumed by the strings of the spinet. The harpsichord was substantially a horizontal harp, played by means of keys with jacks and quills. It was manufactured in Italy early in the 16th century, and long maintained its place, being extended from 4 to at least 6 octaves, and often having double strings; while into some of its improved forms were introduced pedals, and even arrangements for transposing the music by shifting the action of the keys to different sets of strings. The most distinguished harpsichord maker of London, from about the year 1740 to 1775, was Burckhardt Tschudi, whose son-in-law, John Broadwood, was one of the earliest piano makers in England, founding the firm still represented in London under this name. The transition from the instruments now named to the piano appears to have taken place about 150 years since; and yet, unless we may rely on the article by Maffei in the *Giornale de' letterati d'Italia* (Venice, 1711), we must regard the place of this important invention and the inventor's name as obscure, or even lost. The invention has been claimed in turn by Italians, Germans, French, and English. By some writers it is asserted that the first improvement from the spinet and harpsichord consisted merely in the introduction into the latter of hammers, formed each of a leather button on the top of a short stout wire, taking the place of the jack. These hammers could not readily enough quit the string after striking, and its tone was in this way deadened. Such a change would form no marked improvement on those instruments. But the article of Maffei, above mentioned, which is full and specific, and accompanied with a cut, and which is translated at length in Rimbault's work, describes, as having been constructed by Bartolommeo Christofali, a harpsichord maker of Padua, an instrument in which the strings were vibrated by hammers, and each through a complex mechanism, the parts of which were a key, lever, movable tongue acting on the hammer, the hammer, its rest of silk strings, and a damper. Such a mechanism would allow of the rapid stroke and sudden recedence of the hammer, leaving the string free to vibrate until, by releasing the key, the damper should be allowed to check its movement; and thus it would accomplish in a manner all that was aimed at in the earlier "actions" of German and English makers. If this account be genuine, it settles a long controversy, and proves Christofali (before 1711) the real inventor of the pianoforte. In 1716 Marius, a French maker of harpsichords, submitted to the academy four forms of instruments of which he claimed to be the inventor, and termed by him *clavecins à maillets* (hammer harpsichords). In some of these the hammers were in a degree detached from the keys. A third claimant to the invention is Christopher Gottlieb Schröter, who asserted some years later the fact of his having devised in 1717 an arrangement of keys, springs, and hammers, which others were already employing without due credit. He is believed by some to have suggested the present name by his statement, in a published account in 1763, that on his instruments the performer "at pleasure might play *forte* or *piano*." At the outset, however, the instrument was not appreciated, a fact that may account for the obscurity resting over its origin. Silbermann of Freyburg first became somewhat popular as a manufacturer; and it is known that in 1747 Frederic the Great was so pleased with some pianofortes of his, that he purchased the whole stock, 15 in all; but these were still so imperfect that they were allowed to fall into disuse when, in 1765, the king received an improved harpsichord from Tschudi of London. Of these German instruments, which it would appear were of the square form, the strings were double, and the compass not more than 4½ or 5 octaves. They were adopted, however, by Haydn, Gluck, and other composers of the time; one made for Gluck in 1772 was 4½ feet long by 2 broad, the sounding board at one end only, and the strings mere threads compared with those now in use. The first piano known in England (about 1757) was made by an English monk at Rome. About 1760 many German mechanics arrived in England, two of whom, Viator and Backers, became known by their improvements in pianos. In 1767 the piano was introduced on the stage of Covent Garden theatre as "a new instrument," according to a playbill bearing date May 16 of that year, now in possession of the Messrs. Broadwood. About 1755 the poet Mason had invented an action for the piano; and although this seems not to have come into permanent use, he has by some been claimed even as the originator of the instrument. In 1774 a patent was granted to Joseph Merlin for a compound harpsichord, having hammers on the plan of the pianoforte. A more positive claim on the part of English makers is that concerning the first invention of a grand action, it being admitted that about 1772 Americus Backers, a German, assisted by John Broadwood and Robert Stodart, all in the employ of Tschudi, together succeeded in applying an action, similar to that then in use in pianofortes, to the harpsichord. The action devised by them is essentially the same as that still used by the firms of Broadwood and Stodart in London, early adopted by Pleyel and by Herz in Paris, and known among European mechanics as the English action, in this country more commonly as the Pleyel action. It is marked by simplicity, efficiency, and durability, whence it is called also the direct action; and its improved form is substantially that now used by Messrs. Chickering and sons of Boston, in their square pianos. From the time of this change the harpsichord makers rapidly became piano makers. The earliest entry of a piano on the books of Broadwood and co. occurs under the date of 1771; of a grand piano, 1781. Further facts in the history of the instrument will be better understood after some account of its construction.—The piano is now made in three distinctive forms: the grand, the square, and the upright; in the first two the strings run horizontally, in the third vertically or obliquely upward. Of these, the upright is the form most common in England, the square in the United States. Indeed, the square pianos of the United States probably surpass in workmanship and perfection of tone those of any other country; but the grand piano is that adapted to the introduction of the best mechanism, and hence it is always chosen in cases where, as in a concert instrument, the greatest power and brilliancy are required. In the grand, all the octaves, save about two lowest in the scale, have for each note 3 strings attuned in unison and struck at once by the same hammer; from 4 to 7 of the lowest strings may be single, and through about another octave and a half two strings to each note are often used. The largest of these instruments are known as full or concert grands; a medium size, as semi-grands; a size still less, as parlor grands. The square piano was, until the application to it of mechanism somewhat similar to that of the grands, a very inferior instrument. The upright was at first a grand set on end, and raised on legs; the hammers over or in front of the strings, striking them at their lower ends. In other forms, the hammers are almost invariably below the strings. The first patent for an upright appears to have been granted to William Stodart in 1795. In 1807 William Southwell of Dublin reduced the dimensions of the upright, before very unwieldy, replacing it by the "cabinet," in which also the frame was lowered, and by means of long slender stickers the strings were struck above. In 1811 Robert Wornum introduced the "cottage" upright, 4 to 5 feet high; and in 1827 the "piccolo," rising not more than 3½ feet from the floor. The compass of the scale of piano keys did not at first exceed 5 octaves, from FF, or the F below the lowest of the violoncello, to F in alt. It was next extended to C above; then to F yet above this, making 6 octaves; by a third extension, to the C below; and then, by an added treble string, to G. Thus its compass came to be from CCC (corresponding to about 64 single vibrations per second, and to an open organ pipe of 16 feet length) to G, 6½ octaves above. Pianos of large size are now commonly made with a compass of 7 octaves, the base reaching to about A below CCC, and the treble being extended also by one or more strings. In the London exhibition of 1851 was a piano of 7½, and another of 8 octaves. The corresponding enlargement of the instrument, and especially of the sound board, gives an augmented volume and force of tone; but the deficient quality of the uppermost notes has led good judges to question whether any real advantage is gained by exceeding 7 octaves.—The making of pianos is conveniently divisible into 4 parts: 1, the framing and sound board; 2, the stringing; 3, the keys and action; 4, the ornamental or other case. (1.) In pianos of full to largest size, the sum of the tensions of the strings, when properly stretched in attuning, is not less than from 6 to 12 tons. It follows that the framing, or those parts within the case which serve as a strut or stretcher between the ends of the strings, and which are to resist this enormous pull, must be made correspondingly strong and rigid; since by any gradual yielding under the pull of the strings, their lengths and tensions, and hence their tone, must undergo proportionate change. In the earlier instruments, having small strings, the frame was of timber only. Builders then sought only truthfulness of tone, depth and power being out of the question. With the progress of metallurgy, and the gradual introduction of iron structures, this metal came to be used for the piano frame (*i. e.*, for the platform or parts receiving the strings, which is not to be confounded with the case). This frame was cast in a few parts, which were united by bolts or screws; and this plan is still followed in London, and indeed in Europe generally. In pianos of all forms, the scale of lengths of successive strings required to yield the notes through the compass of the instrument results in a series of strings conveniently grouped in a form identical with or approximating that familiarly known in the harp. In grands, the inner or remote ends of the strings run in a curve representing the curved side of the harp, the treble strings lying to the right hand. In squares, usually, the harp curve is represented by the ends of the strings toward the right hand side of the performer, and lying nearer to him. The ends of the strings corresponding to the straight side of the harp thus lie, in grands, in front, terminating in this case, however, in a less marked curve; and the like extremities in the squares, which until recently always terminated in a straight line, lie to the left hand and back of the instrument. It is near to this part of the strings—at the remote side in squares, and in front in grands—that the hammers are always made to strike, the proper distance of the point of striking being about ⅐ to ⅑ the entire length of each string. The parts of the framing and connections of the strings can now be understood. Always at the ends, which are arranged in what we have called the harp curve, the strings are permanently fastened to pins or studs, now made to enter and project directly from the iron plate. About each one of these, called the hitch pins, a string is in some cases bent, so as to return to the other side, corresponding to two single wires; in other cases, each single wire is secured to a pin by terminating in a loop. In either case, the strings terminate in ends at the opposite (answering to the straight) side, and each is here wound about a larger movable pin, by turning which it is that the tuner increases or relaxes the tension. The plate in which stand the hitch pins is termed the string plate; that receiving and giving support to the tuning pins (wrest pins), the wrest plank; and this, owing to the greater wearonsness of wood than of iron, is almost invariably a wooden strip or plank, though in various ways let into and supported by the iron castings which furnish the required strength to the part. The string plate and wrest plank are secured by bolts and otherwise to firm timbers beneath them; the whole being received within the parts of the case. But the chief part of the strain of the strings is borne, in grands, by means of several strong iron or steel bars rising above the strings, and running parallel with them, and in squares by one or two such bars, these being formerly, and in Europe still in most instances, cast separately, and then firmly screwed down to the iron plates at both ends. Two important improvements in connection with the framing and arrangement of the strings are due to Mr. Jonas Chickering of Boston. He was the first to introduce the plan of casting the entire iron framing with the parallel bars in one piece. This plan, adopted by him in 1838, and cited by Rimbault as "the American plan," is believed to have added greatly to the solidity of the instrument and the permanence and purity of the tone, and to have facilitated the addition of strings, thus enlarging the resources of the keyboard. Mr. Chickering also invented, and first used in Nov. 1845, the circular scale for square pianos, now generally employed by manufacturers in America and Europe. This consists in giving to the row of tuning pins and the wrest planks, previously straight in these instruments, a curved disposition, answering nearly to an arc of a circle; the advantage being that the strings become less crowded, larger hammers and a more direct blow can be secured, and the tone is both strengthened and improved. This improvement was not patented, the inventor preferring to regard it as one of the things of which all makers should have the use. In grand pianos, the framing and sound board are severed across in front, to allow of the rise of the hammers, this part being strengthened by arches of metal and otherwise. The system of metallic bracing, first generally introduced by the invention of Thom and Allen in 1820, was brought nearly to its present form, including the tension bars above referred to, by Pierre Erard of Paris in 1825. The sounding board is a sheet of thin, carefully prepared board, usually made of the best Swiss pine, and free from knots and flaws, strengthened on the under side with small transverse ribs, and now made to extend across nearly the entire instrument, beneath the strings. Its edges merely are grasped between parts of the frame and case, and sometimes at particular points only, so that the middle portion is left free to vibrate. On its perfection the quality of the tones must depend in a high degree. (2.) At the first, steel wires were used for the treble notes of the pianoforte, and brass for the base; and as all the wires were short, those for the lower notes were wound or overlapped by wire of less thickness, for the purpose of increasing their weight, and this to a greater extent than is now required. Mr. Collard introduced in 1827 the plan of bending each wire about the hitch pin, as now commonly practised, thus obviating the tendency of the string to yield, twist, or break, in consequence of the noose formed at the end. Steel wire was also introduced throughout. A few of the lower strings are still wound, the upper of these with soft iron, the lower with copper; and this lapping is now with finer wire, and very close. The length of the vibrating part of each string is determined by the places of two bridges, over or through holes in which the strings are stretched. The bridge nearest the hitch pins is upon and attached to the sound board, to which it aids in communicating the vibration of the strings; the other runs along the edge of the wrest plank or plate, near to the tuning pins. Beyond the bridges at either end, the string is known as dead wire, and any interfering vibration of this part is prevented by interlacing these ends with stout tape, or in other ways. When both supports determining the vibrating length of the string were bridges merely, the blow of the hammer from below tended slightly to elongate the string and to lift it from the nearer bridge, and so altered the tone. To prevent this result, Sébastien Érard invented in 1808 the plan of passing the strings at the end struck by the hammers through holes piercing the bridge or rim projecting from the wrest plank, and so shaping the latter that from these holes the strings slope directly upward to the pins. The effect of this important improvement, termed the upward bearing, is that the string is no longer lifted or appreciably lengthened by the blow of the hammer, since to this the strain of the string is now directly opposed; and its length remaining constant, its pitch is equable and its tone stronger. An improvement called the *à graffe* was also introduced at some unknown date, in which the bridge just spoken of is conveniently replaced by a stud or pin for each string, pierced with 2 or 3 holes for the wires, and made fast below in the wrest plank. This we have seen in a Swiss piano many years old. (3.) By the action of the piano is to be understood the mechanism, consisting of several small interposed parts, by which the pressure of the finger upon each key is to be transmitted in the most effective manner through the hammer to the corresponding string. The oldest of the actions which have been (in modified forms) retained, are those of the square piano. In the original of these the key had upon it near its inner end a lifter of stout wire capped with a soft leather button, this striking and elevating the hammer; while still beyond this rose a sticker which at the same time lifted from the wire a damper above it—a lever having a bit of soft cloth at the end; on releasing the key, this damper returned upon the string, checking its vibration. This arrangement formed the single action. Its faults were that the tone was thin and wiry; that in playing very *piano* the pressure on the key did not always cause the hammer to reach the string; while, if the hammer rest was brought too near the string, the hammer did not quit the latter soon enough, and the effect of this was termed blocking. To remedy these defects, Longman and co. introduced the hopper or grasshopper, invented in 1786 by John Gieb. This hopper took the place of the lifter; it was a jointed upright piece which, when the key was pressed down, engaged in a notch under the hammer, and just before the instant of striking slipped past the end of the hammer, allowing this after the blow suddenly to fall. With this was employed also a second or under hammer, multiplying the velocity of the first, on the principle of the compound lever. This mechanism was the double action, still substantially in use with many makers in uprights and squares. To this was afterward added the Irish damper, the invention of Southwell (1794-'8), which was simply an upright rod, with a piece of soft cloth above, which the key, so long as it remained depressed, lifted off the string. Still, the hammers would sometimes rebound from the string with such force as to return upon it, checking its sound. To remedy this, a small, inclined, rough surface of felt was so fixed on a wire support as to be rubbed by the head of the hammer in its descent, and thus gradually to destroy its velocity; this was called the check. The English grand action, so called, already alluded to as that of Backers, adopted by Broadwood, Stodart, and others, consisted of a key, a jack (lever, in place of the hopper), a button so placed as to regulate the sweep of the jack, a spring pressing to restore the jack to its place after the movement, a hammer on the but of which the jack acted, the check, and a damper arrangement, of which various forms could be employed, with rails and sockets connecting or fixing the needful points. But in this arrangement it was still a defect that, after a stroke of the hammer, the jack could not reëngage it until, by release of the key, the parts had returned to their first position. This required time, and any note could not be rapidly repeated. The defect was first remedied by an invention of Sébastien Érard in 1821, improved in 1827, termed the repetition action. This was an improvement upon a previous action of his, which as now modified, under the name of the French action, is still in use with many makers in America and Europe, and the origin of which is believed to be due to Petzold. In the repetition action, consisting of an arrangement of levers and springs too complex to be described here, the hammer is caused to be, through its whole sweep, at the command of the player, so that the note can be reproduced at half stroke, or at any fraction of an entire stroke. To secure this result, when the hammer recoils from the string, it is, by means of a roller, lever, and spring, upheld so long as the key is not entirely released, and in such a way that it can neither return to the string nor fall; and while thus suspended near the string, its blow upon the string may be, by aid of an escapement button, repeated at the pleasure of the player. The French repetition action is thus complex and delicate. Broadwood retained the English grand action, applying to it directly a repetition adapted from the French by Southwell, probably in 1827. This was accomplished by passing through the hammer butt a block or bar, a spring pressing upon this so that when the jack passes the notch it is caught by this bar, and the hammer is sustained ready to repeat the blow, until, as before, the key is entirely released. The escapement button also appears in this arrangement, and a second spring determining the height at which the hammer shall rest. The varieties of grand action are very great, those used in the United States being all based on either the English, now described, or the French of Petzold and Érard. The Messrs. Chickering have employed several grand actions, the chief of which are three. In the first, mainly their own invention, an under hammer is sustained for the repetition movement by a spring lifting it from a spur near the foot of the jack, until the latter falls by release of the key; in the second, the Howe action, repetition is secured by acting directly on the hammer, without under hammer or lever; the third is a modification of Érard's. Their establishment for the manufacture of pianos is the second in importance of those now existing; the order being as follows: Broadwoods, Chickerings, Collards, Pleyel, and Érards. Stops were early introduced into the piano, but, save in parts of continental Europe, they have been abandoned; several pedals are there also used, but in England and this country only two, one for *forte* effects, the other for *piano*. The *forte* pedal is quite effectual, and beside not injurious to the instrument. The earlier *piano* pedal, passing the action to one string, is straining to the centres of the hammers, and apt to disturb the tuning of the unisons—the strings intended to yield the same note. The *jeu céleste*, a later pedal arrangement, obviates these defects. In this, tongues or strips of soft leather or wool are so held, that by pressure on the pedal they can be raised between the strings and the hammers, thus softening the sound. This, of late somewhat contested, we have seen in a piano of Petzold's, marked 1823; and in the same also the long or full sound board, supposed by many to have been more recently introduced, is found. It should be added that the hammers are of wood, the heads covered, according to size, with one or more layers of thick and firm felt. This material, soft woollen, &c., are introduced in many parts also to prevent the click or rattling which would otherwise attend the movements. Various contrivances have been resorted to for the purpose of securing sustained sounds in the pianoforte; a very good example of these was Mott's *sostinente* pianoforte (1817), in which the continued tone was obtained by communicating the vibration of the strings to silk threads and skeins arranged in a peculiar manner. The æolian attachment of M. Isoard consists in causing a current of air, supplied by a bellows, to act on the string, thus prolonging its tone on the principle of the æolian harp. A similar effect is produced by the æolian attachment invented by Mr. Obed Coleman of Barnstable, Mass., about 1842. In "transposing pianofortes," the keyboard and action, or the strings and framing, can be shifted laterally, so as to cause the hammers to strike a different set of strings, thus transposing the music, according to the arrangement, a half or whole note, or several notes, upward or downward. Melographic pianos, or those which, by added mechanism, shall register and preserve the improvisations of a composer, have been attempted by many, dating from the time of Hohlfeld, who, at the suggestion of Euler, essayed this in 1752. Probably the most successful attempt of this kind is that of M. Debain of Paris, exhibited in 1851. (4.) It is unnecessary here to detail particulars concerning the case of the piano, or concerning the various woods, metals, and other materials found to be best fitted to enter into its construction. The manufacture of the instrument gives employment to a great variety of artisans, among whom the work of the several parts is minutely divided; these are the key makers, hammer makers, hammer leatherers, string makers, stringers, case makers, finishers, &c. The construction is a slow process, and cannot well be hurried; a grand piano usually requiring to be 6 months in making.—A few words require to be added in respect to certain other modifications introduced into the construction of the piano in the United States. Mr. F. C. Lighte of New York has patented a peculiar construction of the iron frame holding the wrest plank, by means of which he considers the strain of the strings to be more firmly and equably sustained than in other grand pianos. Another patent of Mr. Lighte covers the application about the screws by which the frame is bolted down, &c., of collars or washers of rubber, or other yielding material; by this means he believes that the tendency of the iron frame to control the vibratory parts of the instrument is obviated, and the metallic character of the tones sometimes imparted by the iron frame overcome. Many makers employ what is called the overstrung base. This is an arrangement by which at least two of the lowest octaves are raised, running diagonally in respect to the other strings, above them, and barely clearing them where at the striking end the hammers rise. Who first introduced the overstrung base may not now be known; but it is found in a Russian piano now in New York, made at least 15 years since. In squares, one advantage offered by this plan is that of greater length for the base strings than could otherwise be obtained; but in grands, space enough is obtained without this change, and it is doubtful whether in these it affords any advantage. In any case, the two sets of strings are differently circumstanced; and in consequence an apparent break or inequality of tone is apt to occur in passing from one to the other, which it is difficult for the maker or the player wholly to obviate. Mr. Spencer B. Driggs placed in the New York exhibition of 1853 a piano which he claimed to possess some points of peculiar excellence. He constructed the sound board double, an upper and a lower, each firmly secured at the edges, and the strengthening ribs being dispensed with in the upper. Thus he obtained a sounding chamber and walls having some of the characteristics of those of the violin; and a marked volume and sweetness of the tones of the instrument are said to have been the result. Mr. Driggs claims more recently to have invented a new scale for the arrangement of the strings of the pianoforte. In this he discards the harp shape, so placing the bridges that, from the treble to the base, each string, for whole or half note, is exactly doubled in length for its octave below. He believes that thus the scale is made not only mathematically correct, but acoustically true; a view, however, which appears to conflict with relations established in the nature of music between the intervals and their octaves. In the London exhibition (1851), Mr. Pirsson of New York displayed a double grand pianoforte—two grands in a large oblong case, the players sitting facing each other. The earliest makers in the United States are believed to have been Mr. Osborn and Mr. J. Thurston; and after these Mr. Stodart, from the London house of that name. Statistics of the manufacture of pianos in the United States are at the present time hardly accessible. The Messrs. Chickering, established in 1823, have now reached (March, 1861) the number of 23,800 pianofortes manufactured by them. The Messrs. Collard of London sold during 20 years, to 1851, about 32,000 pianofortes; the Messrs. Broadwood, during the same time, 45,863. In 1853 the production in all England was estimated at 1,500 instruments per week; of these not quite 10 per cent. were grands, a like proportion squares, and the remainder uprights.—Some degree of error prevails in regard to the mode of securing force of tones, in performing on the pianoforte. Loudness of tone is not due to the force or momentum with which the key is struck, but to the time that is occupied in depressing the key, *i. e.*, to the velocity given to the hammer. If in one case the time consumed in putting down the key can be made but half what it was in another, the velocity of the hammer will be doubled, and the intensity of the blow and of the tone will be correspondingly augmented. Hence, in performing, it is easy to waste much strength to no purpose; and much of the gesturing, and even of the action of the hand and arm in playing, is simply of this character. Still it is true, as Thalberg has said, that the touch of the keys of no two players is alike; and that differences of style and degrees of excellence in playing depend very largely on this cause. Between the mind of the player and the strings there is a double mechanical action: first, that of the player's hand and fingers; secondly, that by which the keys act upon the strings. Evidently, the action of the piano, which continues that of the fingers, should have a delicacy and power as nearly as possible answering to that of the hand of the player; and not only will the touch of each performer be characteristic, but beside, for the same performer, every variation in the action will occasion a corresponding difference in the tones and susceptibility of expression of the instrument. Finally, by contributing to refined enjoyments, and at home, the piano takes rank in social importance before any other musical instrument.—For further information respecting the history and construction of the pianoforte, the reader is referred to Fischhof's *Versuch einer Geschichte des Clavier-Baues* (8vo., Vienna, 1853); Pole's "Musical Instruments in the Exhibition of 1851" (printed for private circulation); and to Rimbault's "Pianoforte," &c. (4to., London, 1860). In respect to performing, tuning, &c., see works published in England by Czerny, Kalkbrenner, and Chaulieu, and various other popular manuals on the subject.

PIARISTS (Lat. *pius*, pious), or Fathers (Regular Clerks) of the Pious Schools, a religious order in the Roman Catholic church, whose members take, in addition to the three common monastic vows, a fourth, to devote themselves to the gratuitous instruction of youth. The order was founded at Rome by St. Joseph Calasanza (born in 1556, died in 1648), a Spanish priest of noble birth, who, in 1597, in union with three other priests, opened a free school, which was soon attended by upward of 700 children. In 1617 Pope Paul V. conferred on the corporation of teachers the rank of a religious congregation, and in 1621 Gregory XV. gave them all the privileges of a religious order. The same pope in 1622 confirmed their rule, and appointed Calasanza their first general. The order was suppressed by Innocent X. and reëstablished by Clement IX. It spread rapidly through Italy, Germany, and Poland, and became eminently popular. It even, to a large extent, escaped the opposition to which in the 18th and 19th centuries many other orders had to succumb. Thus the Piarists suffered less than any other order from the reformatory decrees of the emperor Joseph II. of Austria, and were exempted from the general suppression of convents in Spain in 1836. More recently they were equally favored in Sardinia (1855) and in other parts of Italy (1860). In 1860 they possessed 28 houses in Italy, 33 in Germany, 32 in Hungary and the dependent countries, 14 in Poland, and about 30 in Spain. They have been recently reintroduced into Cuba. Their constitution is similar to that of the Jesuits. At the head of the order is a general, who is elected by the general chapter for 6 years, and resides together with a procurator-general and two assistants at Rome. Every province is governed by a provincial, and every college has a rector and vice-rector.

PIAST, a Polish husbandman of Kruszwice on Lake Goplo, who, according to national legends, was elected ruler of Poland, at a time of anarchy and dissension, about the middle of the 9th century. Historians regard his son Ziemowit as the founder of the dynasty of the Piasts, who reigned in Poland for more than 500 years in the male line (860–1370), the last being Casimir the Great, in the duchy of Masovia down to 1526, and in a part of Silesia down to 1675, becoming extinct with George William, duke of Liegnitz. (See POLAND.)

PIASTER (Span. and Ital. *piastra*), a silver coin and money of account, used chiefly in Turkey and the Levant, and called in Turkish *ghersh*. It is of very variable value. The piaster of Mocha, an imaginary money of account, is worth 1*s.* 8½*d.* sterling; that of Constantinople, a coin about the size of a half dime, was rated, under the new system of coinage promulgated in 1845, at 4.3 cents; in 1861 it was worth 2.7 cents. The term piaster is also applied to the Spanish and Italian dollars, and is used in South America and the East Indies.

PIAUHI, or PIAUHY, an E. province of Brazil, bounded N. by the Atlantic, E. by the provinces of Ceará and Pernambuco, S. by Bahia and Goyaz, and W. by Maranhão, extending from lat. 2° 42′ to 11° 20′ S., and from long. 40° 20′ to 47° W.; extreme length 740 m., breadth 310 m.; area, 92,000 sq. m.; pop. in 1856, 150,400. Oeiras, the capital, and the only seaport, is at the E. mouth of the Parnahiba. The Parnahiba separates Piauhi from Maranhão. The surface is generally flat, broken at intervals by small hills, and rising into mountains on the S. and S. E. frontiers. Iron, alum stone, copperas, saltpetre, and salt are found. Sugar cane, rice, cotton, tobacco, and mandioc are cultivated, and various species of palm are abundant. Large numbers of horses and horned cattle are reared. Piauhi sends a senator and 3 deputies to the general legislature.

PIAZZI, GIUSEPPE, an Italian astronomer, born in Ponte in the Valtelline, July 16, 1746, died in Naples, July 22, 1826. He entered the order of the Theatins, and after studying at Milan, Turin, and Rome, under Tiraboschi, Beccaria, Lesueur, and Jacquier, became in 1770 professor of mathematics in the newly founded university of Malta. After the breaking up of that institution, he returned to Italy, and became professor of philosophy and mathematics in the college of nobles at Ravenna. But the religious views advanced in his philosophical theses, deemed "too bold for so young a divine," brought him into trouble here, as they had before done at Genoa; and he went to Cremona, where he became a priest, and afterward was professor of dogmatic theology at San Andrea della Valle in Rome, where he had as a colleague Father Chiaramonti, who subsequently became pope under the title of Pius VII. In 1780 he was appointed professor of astronomy and higher mathematics in Palermo, where through his labors and under his direction an observatory was built and finished in 1791. To obtain the instruments for it, he travelled to France and England, making the acquaintance of Lalande, Delambre, Bailly, Legendre, Maskelyne, Herschel, and others. On Jan. 1, 1801, he discovered Ceres, the first of the asteroids known to exist between the orbits of Jupiter and Mars. In 1803, under the title of *Stellarum Inerrantium Positiones*, he published a catalogue of 6,748 stars, the results of the observations of 10 years. In 1814 he published a second catalogue embracing 7,646 stars, of which the 7th annual report of the London astronomical society says: "It exceeds every thing of the kind which preceded it, and shows more powerfully than words can express what may be effected by the talents and assiduity of one individual." In 1817 he was called to Naples to take charge of the new observatory erected on the heights of Capo di Monte. He wrote many valuable works on astronomy.

PICARD, JEAN, a French astronomer, born at La Flèche in 1620, died in 1682 or 1684. He assisted Gassendi in observing the solar eclipse of Aug. 15, 1645, was appointed in 1665 his successor in the chair of astronomy at the college of France, and became in 1666 one of the original members of the academy of sciences. His introduction of several improvements in practical geometry greatly increased the exactness of scientific observations. In connection with Auzout he reinvented the micrometer, was the first to apply a telescope in the measurement of angles, devised methods of verification in astronomical investigations, made the first exact measurement of a degree of the meridian, and pointed out the two fold phenomena of nutation and aberration, afterward explained by Bradley. He also introduced the modern method of determining the right ascension of the stars by employing a pendulum to note the instant of their meridional passages. In order to make the observations of Tycho Brahe more accessible to astronomers, he visited Uranienburg in 1671 to ascertain the latitude and longitude of the observatory at that place. He welcomed to France the celebrated Cassini; and when, through his exertions, the observatory of Paris was established, he saw without envy the Italian philosopher promoted to the directorship of an institution of which he himself was the father. He wrote valuable astronomical works.

PICARDY, an ancient province of N. France, bounded N. by the straits of Dover and Artois, E. by Champagne, S. by Ile de France, and W. by the English channel and Normandy. It was divided into Upper Picardy, including the districts of Amiénois, Santerre, Vermandois, Thiérache, Laonnais, Soissonnais, Noyonnais, Valois, and Beauvaisis; and Lower Picardy, comprising the *pays reconquis*, Boulonnais, Ponthieu, and Vimeux. The name of Picardy is not traced further back than the 13th century; it was then applied to several counties held by vassals of the count of Flanders, and was derived either from the Latin *picardus*, pikeman, as the inhabitants were celebrated for their skilful handling of the pike, or from the old French *picard*, boisterous, quarrelsome. The province was subdued by the English under the reigns in France of Philip VI. and Charles VI., reconquered by Charles VII., who mortgaged it to the duke of Burgundy, and finally restored to the crown in 1463, under Louis XI. Its capital was Amiens. It forms now the department of Somme and parts of Pas-de-Calais, Aisne, and Oise.

PICCINI, Nicola, an Italian composer, born in Bari, in the kingdom of Naples, in 1728, died in Passy, near Paris, May 7, 1800. At 14 years of age he was placed in the conservatory of San Onofrio at Naples, where he studied under Leo and Durante for upward of 12 years. He first wrote several comic operas for the theatres of Naples, after which he produced at Rome in 1758 his *Alessandro nell' Indie*, a serious opera, containing one of the finest overtures ever composed. Two years later appeared his *Cecchina*, or *La buona figliuola*, the drama of which, by Goldoni, was founded upon Richardson's "Pamela." It obtained a popularity without a precedent. It was succeeded by *Olimpiade*, a subject previously set by Pergolesi and other celebrated composers. For nearly 15 years Piccini continued to retain the favor of the people of Rome; but being at length supplanted by Anfossi, he retired to Naples, where he received a cordial welcome, and in 1776 visited Paris for the purpose of writing for the French opera. Gluck, whose *Iphigenia in Aulide* had just been produced with great success, was the reigning favorite of the hour, and Marmontel and other partisans of Italian music, who were opposed to the new ideas of the German composer, supported Piccini, then in the zenith of his fame, with all their influence. The next 3 years are famous in musical annals as the period of the celebrated war between the "Gluckists" and the "Piccinists," during which Paris was convulsed as if by a political revolution. Marmontel modernized Quinault's drama of *Roland*, and with infinite labor went over the whole work, word by word, and passage by passage, with Piccini, who was totally ignorant of the French language. The composer, whose facility was attested by the production previous to this time of the enormous number of 300 operas, found little difficulty in setting the words to appropriate music, and, after a twelvemonth of delays and difficulties of all kinds, *Roland* was performed with complete success. Piccini next produced *Atys* and *Iphigénie en Tauride*, and remained in France until 1791, when, having been deprived of his pensions and employments in consequence of the revolution, he returned to Naples. The imprudent expression of the political opinions he had imbibed in Paris led to his arrest and disgrace, and in 1798 he returned to Paris poor and enfeebled in health. With much difficulty he succeeded in procuring from Bonaparte, then first consul, the post of inspector of music at the national conservatory in Paris, which he held at the time of his death. As a musician Piccini is distinguished for the purity and simplicity of his style, and for his efforts to preserve the supremacy of the voice in operatic compositions.

PICCOLOMINI, a celebrated family of Italy, which came originally from Rome, afterward settled in Sienna, and subsequently obtained possession of the duchy of Amalfi. The most conspicuous members of this family are the following. I. Æneas Sylvius, who became pope under the title of Pius II. (See Æneas Sylvius.) II. Alessandro, archbishop of Patras, born in Sienna about 1508, died there, March 12, 1578. He wrote numerous works on natural philosophy, mathematics, astronomy, and philosophy, and composed several successful dramas. In private character he was not blameless, but he was a man of great charity, especially to needy men of letters. He was one of the first to employ the Italian language in philosophical works. III. Francesco, born in 1520, died in Sienna in 1604. He was a follower of Plato, and taught philosophy for 22 years in Sienna, Perugia, and Padua. He wrote *Universa Philosophia de Moribus* (fol., Venice, 1583) and "Commentaries upon Aristotle" (4to., Mentz, 1608). Sienna upon his death went into mourning. IV. Ottavio, duke of Amalfi, an Austrian general, born in 1599, died in Vienna in 1656. At an early age he entered the Spanish service, and afterward went to Germany as captain of horse in a regiment which the duke of Florence had sent to the assistance of the emperor Ferdinand II. against the Bohemians. In the battle of Lützen he commanded the cavalry regiment in an encounter with which Gustavus Adolphus lost his life. He was treated with great favor by Wallenstein, but when that general meditated treason he informed the emperor of the plot, and was ordered by Ferdinand to capture Wallenstein dead or alive. Before he could execute this command Wallenstein was assassinated by other hands, but Piccolomini received part of his estate. During the remainder of the 30 years' war he held important commands against the Swedes. In 1635 he was sent with a body of troops to act in the service of the king of Spain, and drove the French from the Netherlands, but was less successful against the Dutch. His victories over the Swedes led Philip IV. of Spain to ask his services, and he fought a second time with advantage at the head of the Spanish forces against the French and Dutch. In 1648 he was recalled and made marshal. After the peace of Westphalia he was sent to the convention of Nuremberg (1649), with full powers, and subsequently was raised to the dignity of prince of the empire. He was childless, and his son Max, spoken of in Schiller's "Wallenstein," is a poetic fiction.

PICHEGRU, Charles, a French soldier, born at Arbois, Franche Comté, Feb. 16, 1761, died in Paris, April 6, 1804. At the age of 16 he became a tutor in the military school at Brienne, where Napoleon Bonaparte was then a student. He soon enlisted in the army, served in the American war, and was on the eve of promotion when the revolution broke out. Returning to his native province, he became president of the democratic club at Besançon, was elected commander of a battalion of volunteers, joined the army on the Rhine, became staff officer in 1792, soon rose to the rank of brigadier general and then of general of division, and in Oct. 1793 was promoted to the chief command of that army. Having only raw recruits to oppose to the well trained troops of Austria, he conducted the campaign by skirmishing and surprises with tolerable success. In 1794, through the influence of St. Just, he was placed at the head of the army of the north, perhaps the worst clad and least cared for, but the most heroic of French troops. Rather by the energy of his soldiers and subordinate officers than his tactics, he worsted the enemy at Menin (April 13), Turcoing (May 18), and Hooglede (June 10), crossed the left bank of the lower Rhine, drove back the English and Dutch, entered the city of Amsterdam, Jan. 20, 1795, and organized the "Batavian republic." Sent back to the army on the Rhine and disgusted with the revolutionary government of France, he listened to proposals from the prince of Condé to bring about a restoration of the monarchy; he was promised in the name of the future king 1,000,000 francs and an income of 200,000 francs per annum, the duchy of Arbois, the castle of Chambord, and the governorship of Alsace. He now permitted his troops to be worsted by the Austrians; but the suspicions of the directory being aroused, he was recalled to Paris in 1796 and deprived of his command. The next year he succeeded in being elected to the council of 500, was made its president, and became the acknowledged head of the reactionary party, which openly aimed at the restoration of the Bourbons. On the 18th Fructidor (Sept. 4, 1797) he was arrested with a number of his adherents, sentenced to transportation, and banished to Sinnimari, Guiana. Thence he escaped with many perils, repaired to London, and then to Germany, always devising plans for the overthrow of the French republic. Returning to London, he became acquainted with Georges Cadoudal, in concert with whom he planned the assassination of the first consul. Both secretly repaired to Paris in 1804; but the police was on its guard; Georges was arrested in the street, and Pichegru was betrayed for a bribe by a friend, and incarcerated in the Temple. A few days later he was found dead in his cell. It was rumored that he had been despatched by order of Bonaparte; but the probability is that he strangled himself in despair. A bronze statue that had been erected in his honor on a square at Besançon under the restoration, was destroyed by the people in 1830.

PICHINCHA, a volcano of the Cordilleras of South America, near Quito in Ecuador, 14,940 feet in height. It has two peaks, the principal of which, called in the Quichua language Guagua-Pichincha, is covered with snow; the lesser is called Ruco-Pichincha; the two designations meaning the old and the young Pichincha.

PICKAWAY, a central co. of Ohio, intersected by the Scioto river, and drained by Darby, Deer, and Walnut creeks; area, about 500 sq. m.; pop. in 1860, 23,469. It has a level surface and a very fertile soil. The productions in 1850 were 2,672,905 bushels of Indian corn, 144,377 of wheat, 55,494 of oats, 131,261 of potatoes, and 73,989 lbs. of wool. There were 6 grist mills, 2 saw mills, 3 woollen factories, 8 tanneries, 4 newspaper offices, 47 churches, and 6,625 pupils attending public schools. It is intersected by the Ohio canal, and by the Cincinnati, Wilmington, and Zanesville railroad, which passes through the capital, Circleville.

PICKENS. I. A N.W. district of S. C., bordering on N. C. and Ga., bounded N. E. by the Saluda, S. W. by the Tugaloo, and N. W. by the Chattooga river, and drained by the Kiowee river and its branches and other small streams; area, about 1,100 sq. m.; pop. in 1850, 17,004, of whom 3,079 were slaves; whites in 1860, 15,335; slaves, 4,195. Its surface is uneven, the Blue ridge extending along the N. and N. W. border. Table rock in the N. is stated to be 4,000 feet high. Much of the soil is fertile. The productions in 1850 were 634,011 bushels of Indian corn, 42,052 of wheat, 125,406 of oats, 102,886 of sweet potatoes, 28,044 lbs. of rice, 19,427 of wool, and 1,357 bales of cotton. There were 2 grist mills, 7 saw mills, 12 distilleries, 4 tanneries, 1 newspaper office, 54 churches, and 355 pupils attending public schools. Capital, Pickens Court House. II. A W. co. of Ala., bordering on Miss., and drained by the Tombigbee and its branches; area, about 1,050 sq. m.; pop. in 1860, 22,319, of whom 12,192 were slaves. Its surface is uneven and the soil generally fertile. The productions in 1850 were 868,705 bushels of Indian corn, 157,537 of sweet potatoes, 32,612 lbs. of rice, and 12,905 bales of cotton. There were 3 grist mills, 8 saw mills, 3 tanneries, 2 weekly newspapers, 44 churches, and 718 pupils in public schools. Capital, Carrollton.

PICKENS. I. Andrew, an American general and statesman, born in Bucks co., Penn., Sept. 19, 1739, died in Hopewell, Pickens district, S. C., Oct. 11, 1817. His family removed to South Carolina in his boyhood and settled in a frontier region. In 1761 he served as a volunteer with Moultrie and Marion in the successful expedition led by Col. Grant against the Cherokees; and at the outbreak of the revolution he declared in favor of the colonists and was made a captain of militia, from which position he rose by regular promotion to the rank of brigadier-general. With Marion and Sumter he kept the field at the head of a partisan corps after the state had been overrun by the British. In 1781 he led an expedition against the Cherokees, whom he completely subdued in a brief campaign, by which South Carolina obtained a large cession of territory now constituting a portion of the state of Georgia; and soon after he defeated and dispersed a large body of loyalists, under Col. Boyd, at Kettle creek. At the battle of Cowpens he commanded the militia. For his conduct on this occasion congress voted him a sword. His next important service was the investment of the British forts at Augusta, Ga., which after a siege of two weeks surrendered. After participating in the unsuccessful siege of Ninety-six under Gen. Greene, he followed the retreating enemy toward the seaboard, and at the battle of Eutaw Springs led one of the brigades of the South Carolina militia, Marion commanding the other. Here he received a severe wound in the breast from a musket ball. He was subsequently engaged in the negotiation of a treaty with the Cherokees at Hopewell, and soon after settled at Hopewell, was elected to the legislature, and became a member of the convention by which the constitution of the state was adopted. He held his seat in the legislature until 1794, when he was chosen a member of congress; subsequently served again in the state legislature; and in 1801 retired from public life, reappearing for a brief period in 1812. II. Francis W., an American statesman, grandson of the preceding, born in Toogadoo, St. Paul's parish, S. C., April 7, 1807. His father, Andrew Pickens, a lawyer of wealth and ability, was governor of the state in 1816–'18. The son was educated at the South Carolina college, Columbia, and was in 1829 admitted to the bar, and commenced practice in Edgefield district. In 1832, during the height of the nullification excitement, he was elected to the legislature by the nullifiers of his district, and soon distinguished himself as a debater. At the age of 25 he was a prominent member of the judiciary committee and the committee on foreign relations; and as chairman of a subcommittee appointed in 1833 to consider the relations of sovereignty and allegiance, he made a report to the effect that sovereignty was a thing indivisible, and consequently allegiance was indivisible also. Congress, as the agent and mere creature of the states severally, had no claim to allegiance and could exercise no sovereignty, the latter doctrine resulting directly from the former. In 1834 he was elected to congress, of which he remained a member during the next 10 years. In 1836 he made an elaborate speech denying the right of congress to abolish slavery in the district of Columbia without the consent of Maryland and Virginia. In 1844 he declined a reëlection to congress, and was elected to the South Carolina senate from Edgefield. The "Bluffton movement," a demonstration on the part of certain citizens of the state to secede from the federal Union, was then in progress, and was advocated by Mr. Hammond, then governor of the state, and other prominent men. Mr. Pickens voted with the majority against the measure. After remaining several years in private life, he was elected a delegate to the Nashville southern convention which met in 1850–'51 to consider the proper course to be pursued by the South under the alleged aggressions of the North. In 1854 he presided over the South Carolina state convention called to elect delegates to the next general democratic convention, and in 1856 he went to Cincinnati as a delegate to that convention. In 1857 he was appointed by Mr. Buchanan minister to Russia, and upon his return from that country in the latter part of 1860, before the state had declared its secession from the Union, he was elected governor of South Carolina, which position he still holds (1861). Mr. Pickens is a planter of great wealth, and has devoted much attention to the scientific pursuit of agriculture. As an orator before colleges and literary societies he enjoys a considerable reputation in the southern states, and for many years he has been collecting materials for a political history of the country during the period he has been in public life.

PICKEREL. See Pike.

PICKERING. I. Timothy, an American soldier and statesman, born in Salem, Mass., July 17, 1745, died there, Jan. 29, 1829. He was graduated at Harvard college in 1763, and soon afterward became a clerk to John Higginson, register of deeds for the county of Essex. In 1768 he was admitted to the bar. From 1770 to 1777 he served, at different times, in most of the municipal offices in Salem, and on the committees of correspondence, inspection, and safety. In Aug. 1774, he with other members of the committee of correspondence was arrested at the instance of Gov. Gage, for calling a town meeting on public grievances; but in September the magistrate who had issued the warrant for the arrest recalled it, being alarmed by the unpopularity of his act. In 1775 Mr. Pickering was appointed one of the judges of the court of common pleas for the county of Essex, and sole judge of the prize court for the middle district, composed of Suffolk, Essex, and Middlesex. Impressed with the importance of calling the attention of the public to military instruction and discipline, he wrote essays on the subject for the newspaper, and published in 1775 "An Easy Plan of Discipline for a Militia," which was ordered by the legislature of Massachusetts (May 1, 1776) to be used by the militia of the colony. In the autumn of 1776, the army under Gen. Washington being greatly reduced in numbers, a large reënforcement of militia was called for, and Mr. Pickering, who then held a commission as colonel, took the command of the regiment of 700 men furnished from the county of Essex. On this tour of duty, which terminated in March, 1777, at

Boundbrook, N. J., he had interviews with Gen. Washington, and in May he was invited by him to take the office of adjutant-general, which he at first declined, but afterward accepted. In this capacity he was with Washington in the battles of Brandywine and Germantown. In November congress elected him a member of the continental board of war, in which office he served until Aug. 5, 1780, when congress, by a unanimous vote, elected him quartermaster-general, as successor to Gen. Greene. He continued in this station until July 25, 1785, when the office was abolished. He was present during the siege of Yorktown in 1781, and at the surrender of Lord Cornwallis. On the return of peace he engaged in business in Philadelphia as a commission merchant. In 1786, having been invited to assist in composing the controversy between the state of Pennsylvania and certain emigrants from Connecticut who had settled an extensive tract of land in the valley of Wyoming, which they claimed as falling within the charter limits of Connecticut, and at the same time to organize the new county of Luzerne, embracing the territory in dispute, he removed to Wilkesbarre, with the understanding that he was authorized to give assurances that the legislature would quiet in their possessions a certain class of the Connecticut settlers. An act was passed accordingly, and his efforts as a peacemaker promised a successful result; but the legislature proved inconstant, and by first suspending, and then repealing the act, increased the acrimony and strength of the discontented settlers. Their leader, John Franklin, having been arrested for high treason, some of his adherents, with the hope of obtaining his release, retaliated on Col. Pickering, in the summer of 1788, by entering his house at night, and carrying him into the woods, where they detained him a prisoner for 19 days. An interesting account of the controversy and of his captivity is contained in his letter of Dec. 31, 1818, to his son Henry, printed in Hazard's "Register of Pennsylvania," vol. vii. In 1787 he was the delegate from Luzerne co. to the Pennsylvania convention for acting upon the proposed constitution of the United States, and was earnestly in favor of its adoption. In 1789 he was the delegate from the same county to the convention for revising the constitution of Pennsylvania. Under appointments from President Washington, he made satisfactory treaties with the Six Nations collectively, and with some of them severally, in 1790, '91, and '94; and in 1793 he was joined with Gen. Lincoln and Beverley Randolph in a commission to negotiate with the hostile Indians N. W. of the Ohio; but the manœuvres of Simcoe, governor of Canada, prevented a meeting with those tribes. In 1792 he returned with his family to Philadelphia, having in August of the preceding year been appointed postmaster-general. On Jan. 2, 1795, he was transferred to the office of secretary of war, and on Dec. 12 to that of secretary of state. This position he held during the remainder of Washington's administration, and for more than 3 years under President Adams, who removed him from office May 12, 1800. He now retired to his wild lands in Pennsylvania, with the intention of bringing a portion of them into cultivation; but his friends in Massachusetts joined in the purchase of a large proportion of his lands, in order to enable and induce him to return to his native state. In 1801 he removed to Massachusetts, and subsequently purchased a farm in Wenham, near Salem. He was fond of agricultural occupations and experiments, and cultivated his grounds partly with his own hands. Later in life he was president of the Essex agricultural society. In 1802 he was appointed chief justice of the court of common pleas for the county of Essex. In 1803 the legislature elected him a senator in congress for the residue of the term of Dwight Foster, who had resigned; and in 1805 he was reëlected for the term of 6 years. After the commencement of hostilities against Great Britain in 1812, he was appointed a member of the Massachusetts board of war. From 1813 to 1817 he was a member of the U. S. house of representatives. In politics he was a federalist, and ardently opposed to some of the leading measures of the administrations of Jefferson and Madison. In religion he was a Unitarian. He published several addresses and reports, and a "Review of the Correspondence between John Adams and William Cunningham," and contributed to various periodicals. II. JOHN, an American scholar, philologist, and jurist, son of the preceding, born in Salem, Mass., Feb. 7, 1777, died May 5, 1846. He was graduated at Harvard college in 1796, and soon afterward began to study law. In 1797 he was appointed secretary of legation under William L. Smith, American minister to Portugal, with whom he remained until the autumn of 1799, when he went to London as private secretary to Rufus King, American minister at the court of St. James. In 1801 he returned to Salem, and was admitted to the bar in 1804. In 1827 he removed to Boston, and in 1829 was appointed city solicitor, which office he held until a short time before his decease. In different years he was a representative from Salem in the legislature of Massachusetts, a senator from the counties of Essex and Suffolk, and a member of the executive council. In 1806 he was chosen Hancock professor of Hebrew and other oriental languages in Harvard college, but declined the office. He received the degree of LL.D. from Bowdoin college in 1822, and from Harvard college in 1835. He was a member of the board of overseers of Harvard college from 1818 to 1824, president of the American academy of arts and sciences, originator and first president of the American oriental society, and a member of many scientific and literary societies in Europe. Although constantly engaged in his professional duties, he made large acquisitions in history and philology. In 1820 he communicated to the American academy a scheme for reducing spoken languages to written forms, in an "Essay on a Uniform Orthography for the Indian Languages of North America." He proposed that each elementary sound should be represented by its own distinctive character exclusively, and presented an alphabet formed upon this principle. The system has been applied to the Indian languages of North America and of the islands of the Pacific, and some of those of Africa. The results of Mr. Pickering's studies were for the most part made public in pamphlets or in literary periodicals. In 1816 he published his "Vocabulary of Americanisms" (8vo., Boston). Under the directions of the legislature of Massachusetts, he, in conjunction with Charles Jackson and Asahel Stearns, revised the general statutes of the state, reducing them to a code, which, as modified and adopted by the legislature, was published in 1836. His most important work was his Greek and English lexicon, which he began to prepare in 1814 (before any similar lexicon had been undertaken), and finished with the assistance of Dr. Daniel Oliver and published in 1826. A 2d edition, much enlarged and improved. appeared in 1829; and the revision of the 3d, still further improved, was completed by him just before his decease. Among his other writings separately published may be mentioned "Remarks on the Indian Languages of North America" (8vo., Philadelphia, 1836), and "Memoir on the Language and Inhabitants of Lord North's Island" (4to., Cambridge, 1845). III. CHARLES, M.D., an American naturalist, grandson of Timothy Pickering, born in Susquehanna co., Penn., in Nov. 1805. He was educated at Harvard college in the class of 1823, and was attached as naturalist to the U. S. exploring expedition under Commander Charles Wilkes, 1838–'42. After the termination of that expedition he went to India and eastern Africa, for the purpose of studying the characteristics of different tribes of those countries, and published the results of his researches in his "Races of Man and their Geographical Distribution" (4to., Philadelphia, 1848), and "Geographical Distribution of Animals and Man" (Boston, 1854). Another work, of long study, on the geographical distribution of plants, is now (1861) in the press. It consists of a botanical description and comparison of the countries visited by the exploring expedition, and by him on his subsequent excursion to the Indian ocean. About 50 comparative floras are given, personally examined at all the principal geographical positions on the globe. From hints in ancient authors, and by comparisons and calculations from various numbers in history, he is confident that he has made the discovery that the Egyptian great year consisted of 1,540 years of 365 days each, and that the fabled phœnix was but a measure of time, being 660 years, that is, $\frac{3}{7}$ of the great year. See his "Chronological Observations on Introduced Animals and Plants" (4to., Boston).

PICKERSGILL, HENRY WILLIAM, an English portrait painter, born in 1782. In 1825 he was elected a royal academician, and since 1855 he has been librarian of the academy.—FREDERIC RICHARD, also a painter, nephew of the preceding, born in London in 1820. His first work, "The Brazen Age," in water colors, was exhibited in 1839. His works attracted little attention until the production of his cartoon of the "Death of King Lear," for which he received a prize of £100 at the exhibition at Westminster hall in 1842. He also received one of the 3 first class prizes of £500 for his colossal oil painting of the "Burial of Harold," purchased for a similar sum by the commission appointed to examine the merits of pictures sent to the Westminster hall competition of 1847, and now placed in the new houses of parliament. In 1847 he was elected an associate of the royal academy, and in 1857 an academician.

PICKETT, ALBERT JAMES, an American historian, born in Anson co., N. C., Aug. 13, 1810, died in Montgomery, Ala., Oct. 28, 1858. He went with his father to Alabama in 1818, and studied law. He never applied for a license to practise, however, but after his marriage in 1832 devoted himself to literary pursuits and the care of his plantation. In 1851 he published a "History of Alabama" (2 vols. small 4to., Charleston).

PICKLES, vegetables of various sorts, as small cucumbers, onions, string beans, and cabbage, and also some fruits, such as melons, peaches, India mangoes, and soft unripe nuts, preserved in vinegar to be eaten as a condiment. The articles are steeped or parboiled in brine and then transferred to the vinegar, to which some salt is added, and to give flavor some of a variety of spices are also introduced, as well as mustard, horse radish, &c. East India pickles are flavored with curry powder mixed with mustard and garlic. For some articles the vinegar is used cold, for others hot, and for onions pure distilled vinegar is employed in order that the natural whiteness of these vegetables may be preserved. The use of pickles is so general that they are almost one of the common necessaries of life; and among seafaring men especially their consumption is said to be prodigious. On this account it is a matter of serious consideration, that they are often contaminated with a poisonous salt of copper, which after several receipts given in the cookery books is intentionally introduced for the purpose of giving to the pickles a pleasing bright green color. To obtain this effect the vinegar is boiled in brass or copper vessels, or copper coins are introduced into the boiling liquid, and sometimes verdigris and blue vitriol or the sulphate of copper. This salt is, however, produced by boiling vinegar which contains sulphuric acid in copper vessels, and most of the vinegar that is used in the pickle factories is of this character. Dr. Hassall reports that the samples of pickles examined by him, amounting to 25 in number, all contained copper to some extent, and two or three of them in dangerous quantities. Sulphuric acid also was detected in 19 out of 90 samples of vinegar used for pickling. Numerous fatal cases of poisoning are reported as having occurred from the use of such pickles. The presence of copper may be suspected in all pickles of a brighter green color than the vegetables naturally possess; and it is proved when a bright piece of iron immersed for a short time in the liquid becomes coated with copper; or if, when a bit of the pickles is minced fine and put into a vial with liquid ammonia diluted with an equal amount of water, the liquid becomes blue, it is owing to the presence of copper.

PICO DELLA MIRANDOLA. See MIRANDOLA.

PICRIC ACID. See CARBAZOTIC ACID.

PICTOU, a N. E. co. of Nova Scotia, bordering on Northumberland strait, and drained by several small rivers; area, 845 sq. m.; pop. in 1851, 25,593. Its surface is very much diversified and the soil fertile. It contains extensive mines of coal.—PICTOU, the capital, is situated on the N. shore of an extensive harbor, near the E. end of Northumberland strait, in lat. 45° N., long. 63° 10′ W., 64 m. N. E. from Halifax; pop. about 2,500. The houses are principally built of wood, and there is a neat church, an academy in connection with the Presbyterian church, a grammar school, a library, and a lighthouse at the S. side of the entrance to the harbor. Pictou is a place of rising importance, and has increased very much since the coal mines and quarries of building stone were opened in the neighborhood. Ship building is carried on; and in 1859, 49 vessels of an aggregate of 10,169 tons belonged to the port. The exports consist chiefly of coal, building stone, dried fish, and potatoes. During the year ending Sept. 30, 1859, 105,528 tons of coal were shipped; and the value of the imports was $80,446. In the same year 866 vessels of an aggregate of 64,128 tons cleared from Pictou for ports in the United States.

PICTS, an ancient people of North Britain, inhabiting the eastern coast and lowlands of Scotland. They are first mentioned in a speech of the rhetorician Eumenius, A. D. 296, to the emperor Constantius Chlorus on his return from the victory over Allectus. After this they are frequently spoken of by Roman historians, and Ammianus Marcellinus in the annals of A. D. 368 says that they were divided into the Dicalidonæ and Vecturiones. According to the account of the Scottish historians, they were brought in 843 under the dominion of Kenneth II., who thus for the first time made all Scotland subject to one king. Their name of Picti (painted) is supposed to have been derived from their custom of painting their bodies. It has been a subject of dispute whether they were of Celtic or Teutonic descent, the latter opinion being maintained by Usher, Stillingfleet, and Pinkerton, the former by Camden, Bishop Lloyd, Father Innes, George Chalmers, and Ritson. Their language bore some resemblance to the Welsh, and it was the opinion of Camden that the modern Welsh are of Pictish origin. Architectural remains of a singular character still exist in various parts of Scotland, and are there popularly called Picts' houses; and traditions of a people of that name of uncommon bodily strength have survived to this day.

PICTS' WORK DITCH. See CATRAIL.

PIEDMONT (Ital. *piè di monte*, foot of the mountain), a division in the N. W. of Italy, no longer having a distinct political existence, bounded N. by Switzerland, E. by Lombardy and Parma, S. by Genoa, and W. by France; area, 11,393 sq. m. It is enclosed on 3 sides by a stupendous mountain barrier, and opens on the 4th toward the rest of Italy. It is completely drained by the Po and its tributaries, of which there are 28 on the right bank and 25 on the left. In the intense heat of summer the ground of the plains toward Lombardy becomes so scorched that crops are only saved by a system of irrigation which is developed to great perfection. Some half a million acres are scored with artificial channels; for the privilege of using the water a tax is levied. Thus districts once waste and occupied by a scanty and impoverished population have been reclaimed and are now the granary of the old Sardinian states. Maize and barley are extensively raised; the former is the chief article of food, and the latter is fed to swine. Tobacco being a royal monopoly, its cultivation is strictly prohibited. The silk of Piedmont is the best in Italy, and its silk manufactures are important. Common linens, woollens, and cottons, hosiery, paper, leather, cutlery, beer and other liquors, glass, and iron are manufactured.—Piedmont first took a place in history under the reign of Tommaso I. of Savoy (1188-1233). It has constantly shared the fortunes of that house, during the many wars in which it has borne a part in Italy and Europe. It became a principality in 1424, was merged in the kingdom of Sardinia in 1718, and with Sardinia in the kingdom of Italy under Victor Emanuel in 1861.

PIERCE. I. A W. co. of Wis., bounded W. by the St. Croix and S. W. by the Mississippi, and drained by the Rush and other rivers; area, about 600 sq. m.; pop. in 1860, 4,674. It has a broken surface covered by prairie and forest, and the soil is fertile. Capital, Prescott. II. A S. E. co. of Minn., bounded S. W. by the Minnesota or St. Peter's river and Big Stone lake, and intersected by the Chippewa and Tipsinah rivers; area, about 1,625 sq. m.; pop. in 1860, 10. It has a rolling surface and fertile soil. III. A W. co. of Washington territory, having Puget sound on the W., bordered S. W. by the Nesqually river, and intersected by the Puyallup; area, about 1,500 sq. m.; pop. in 1860, 1,115. It is traversed by the Cascade mountains. Capital, Steilacoom.

PIERCE, **Franklin**, 14th president of the United States, born in Hillsborough, N. H., Nov. 23, 1804. His father, Gen. Benjamin Pierce, a native of Massachusetts, was one of the earliest settlers in the town of Hillsborough, and served as a soldier and officer throughout the revolutionary war. He was an influential democratic politician, in 1827 and 1829 was elected governor of the state, and died in 1839 at the age of 81. Franklin Pierce received his early education at the academies of Hancock and Francistown; and in 1820 he entered Bowdoin college, at Brunswick, Me. His ambition at this period was of a military cast, and he was a zealous officer in a college company of soldiers in which his future biographer, Nathaniel Hawthorne, was a private. During one of his winter vacations he taught a country school. He was graduated in 1824, and having chosen the law as a profession, became a student in the office of Judge Levi Woodbury at Portsmouth, afterward distinguished as a U. S. senator and a member of the cabinet. Pierce subsequently studied for two years in the law school at Northampton, Mass., and in the office of Judge Parker at Amherst, N. H. He was admitted to the bar in 1827, and began practice at Hillsborough. He did not at first succeed as an advocate, and his first case was a marked failure. He remarked to a friend who condoled with him: "I will try nine hundred and ninety-nine cases, if clients will continue to trust me, and, if I fail just as I have to-day, will try the thousandth. I shall live to argue cases in this court house in a manner that will mortify neither myself nor my friends." For some time politics diverted his attention from his profession. He was an ardent advocate of the election of Gen. Jackson to the presidency, and in 1829 was himself elected by the town of Hillsborough its representative in the state legislature. He served 4 years in that body, and in the last 2 years was chosen speaker, receiving three fourths of all the votes of the house. In 1833 he was elected a member of congress, where he served on the judiciary and other important committees, but did not attain to distinction in debate. He sustained Jackson's opposition to the internal improvement system, and made a speech against the bill authorizing an appropriation for the military academy at West Point, to which institution he was long opposed, though during the Mexican war he saw reason to change his opinion on that subject. On the question of slavery he sided with the South, and opposed anti-slavery measures in every shape. He remained a member of the house of representatives until 1837, when he was elected to the U. S. senate, in which he took his seat as the youngest member, having barely reached the legal age for the position. In the senate at that time were Clay, Webster, Calhoun, Benton, Buchanan, Woodbury, and Silas Wright. Mr. Hawthorne says: "With his usual tact and exquisite sense of propriety, he saw that it was not the time for him to step forward prominently on this highest theatre in the land. He beheld these great combatants doing battle before the eyes of the nation and engrossing its whole regards. There was hardly an avenue to reputation save what was occupied by one or another of those gigantic figures." He made in 1840 a speech upon revolutionary pensions, and in 1841 another on the removal of persons from office by the new whig administration, and in 1842 resigned his seat and returned to the practice of his profession at Concord, N. H., to which place he had removed from Hillsborough in 1838. He soon became distinguished as an advocate, and in 1846 President Polk offered him the post of U. S. attorney-general, which he declined. He also declined to be a candidate for governor, the nomination to which office had been given to him by a democratic state convention. He still, however, continued to manifest an interest in politics, and vigorously supported the annexation of Texas in opposition to a considerable portion of the democracy of New England. In 1847, when the state of New Hampshire was called upon to furnish troops for the Mexican war, he enrolled himself a member of one of the first volunteer companies of Concord, but did not long remain in the ranks; for on the passage by congress of the bill for the increase of the army he received the appointment of colonel of the 9th regiment, and shortly after was commissioned brigadier-general of the army. On May 27 he embarked at Newport with his command, and after a passage of 30 days arrived at Vera Cruz. Three weeks later he led his men to join the main body of the army under Gen. Scott at Puebla, which he reached Aug. 7, after several sharp engagements with guerillas on the way. In the battle of Contreras he was severely hurt by the falling of his horse, but continued during the day at the head of his brigade. In the battle of Churubusco, while leading his men against the enemy, he fell fainting from the pain of his injuries, but refused to quit the field. After the battle, the Mexican commander having opened negotiations for peace, Gen. Scott appointed Gen. Pierce one of the commissioners to arrange the terms of an armistice. The truce was of short duration, and the battles of Molino del Rey and Chapultepec followed, and soon afterward the city of Mexico capitulated. Gen. Pierce remained in the city till December, when, the war being ended, he returned home, and resigning his commission applied himself again to the practice of the law. In 1850 he was elected a member of the convention called by the people of New Hampshire to revise their state constitution, and was chosen president of the convention by an almost unanimous vote. In this position he exerted himself to procure the removal from the constitution of the tests by which Catholics are excluded from certain offices. On June 12, 1852, the democratic national convention assembled at Baltimore, and after 35 ballotings for a candidate for president of the United States, during which not a vote had been given for Gen. Pierce, the Virginia delegation brought forward his name, and on the 49th ballot he was nominated by 282 votes to 11 for all other candidates. His principal competitors were James Buchanan, Lewis Cass, William L. Marcy, and Stephen A. Douglas. At the ensuing presidential election in November he received the votes of all the states except Massachusetts, Vermont, Kentucky, and Tennessee, whose suffrages were given to Gen. Winfield Scott. Of the votes of the electoral colleges Pierce received 254 and Scott 42. In the midst of this sudden and astonishing political success the president elect was smitten with a terrible domestic calamity. On Jan. 6, 1853, while making with his family a railroad journey from Andover to Lawrence, Mass., the cars were thrown off the track and dashed against rocks, and his only child, Benjamin Pierce, a fine boy of 13, was instantly killed. In his inaugural address, March 4, 1853, President Pierce maintained that slavery is recognized by the constitution, and that the fugitive slave law is constitutional and should be strictly executed. He denounced in strong terms the agitation of the slavery question, which he thought had been settled by the compromises of 1850, and hoped that "no sectional or ambitious or fanatical excitement might again threaten the durability of our institutions, or obscure the light of our prosperity." Three days after his inauguration he appointed his cabinet as follows: William L. Marcy, secretary of state; James Guthrie, secretary of the treasury; Jefferson Davis, secretary of war; James C. Dobbin, secretary of the navy; Robert McClelland, secretary of the interior; James Campbell of Pennsylvania, postmaster-general; and Caleb Cushing, attorney-general. At an early period of his administration President Pierce was called upon to deal with a serious question respecting the boundary between the United States and Mexico, a tract of land between New Mexico and Chihuahua, called the Mesilla valley, being claimed by both countries. The dispute was finally settled by negotiation, and resulted in the acquisition by the United States of the region now known as Arizona. In 1853, under the direction of the war department, various expeditions were organized and sent out to explore the routes proposed for a railroad from the Mississippi to the Pacific, of which voluminous reports have since been published. In the same year a serious dispute with Great Britain on the subject of the fisheries was amicably settled by mutual concessions. While these negotiations were going on, much interest was excited both in the United States and in Europe by the affair of Martin Koszta. (See INGRAHAM, DUNCAN NATHANIEL.) The first congress which met during the administration of President Pierce assembled in Dec. 1853. In the following January Mr. Douglas, then chairman of the senate committee on territories, introduced a bill for the organization of two territories, to be called Kansas and Nebraska, in the region W. of Missouri and N. of the parallel of 36° 30′. By the Missouri compromise of 1820–'21 slavery had been formally and for ever excluded from this region. By the bill of Mr. Douglas, which was warmly supported by the administration, the Missouri compromise act was repealed and slavery permitted to enter these territories. In spite of the strenuous opposition of the anti-slavery members of congress, the bill became a law and received the signature of the president on the last day of May. Great excitement and indignation were aroused in the free states by this measure. It was denounced as a flagrant breach of faith, and as the violation of a compromise as sacred as the compromises of the constitution itself. Much dissatisfaction also was produced in the free states by the famous Ostend conference, at which Mr. Buchanan, U. S. minister to Great Britain, Mr. Soulé, minister to Spain, and Mr. Mason, minister to France, were present, and proposed to buy Cuba from Spain for $120,000,000, and in case of her refusal to sell the island to take it by force. A treaty was negotiated at Washington in 1854 between the United States and Great Britain, providing for commercial reciprocity between this country and the British provinces. The treaty with Japan negotiated by Commodore Perry was ratified by the senate at the same session. Two important bills were vetoed by the president, one of which made appropriations for the completion and repair of certain public works, and the other appropriated 10,000,000 acres of the public lands to the states for the relief of the indigent insane. In the spring of 1854, property belonging to American citizens at Greytown in Nicaragua having been stolen and reparation refused by the authorities, the U. S. frigate Cyane was sent there, and on July 13 the place was bombarded and most of it burned. In the following year occurred the fillibuster invasion of Nicaragua by William Walker, whose success in the autumn of 1855 appeared to establish his power, and consequently a minister sent by him to Washington was recognized by the president and diplomatic intercourse opened. In Feb. 1855, a bill that had passed congress for the payment of the French spoliation claims was vetoed by the president, who in the following month also vetoed a bill increasing the annual appropriation for the Collins line of steamers. The other important measures of the same session which received his signature were the bills to reorganize the diplomatic and consular system of the United States; to organize the court of claims; to provide a retired list for the navy; and to confer the title of lieutenant-general on Winfield Scott. At the close of 1854 and during the winter and spring of 1855 circumstances occurred which for a time seriously disturbed the harmony between the governments of the United States and Great Britain. Enlist-ments of recruits for the British army in the Crimea were made secretly in this country under the sanction of Mr. Crampton, the British minister at Washington, whose recall was therefore demanded by the president. This was refused, and the president at length dismissed not only the minister but the British consuls at New York, Philadelphia, and Cincinnati, because of their complicity in the violation of the neutrality laws. The matter was finally settled, and after a vacancy of a few months a new British legation was sent to Washington. The last two years of President Pierce's administration were marked by scenes of domestic discord and sectional dispute concerning affairs in Kansas. (See Kansas.) On Jan. 24, 1856, the president sent a message to congress in which he represented the formation of a free state government in Kansas as an act of rebellion, and justified the principles of the Kansas and Nebraska act. On June 2 of the same year the national democratic convention met at Cincinnati to nominate a candidate for president. The first ballot stood: for James Buchanan, 135; for Franklin Pierce, 122; for Stephen A. Douglas, 33; for Lewis Cass, 6. On subsequent ballots the vote for Pierce gradually diminished, and on the 17th ballot all the votes were given for Mr. Buchanan. Before the adjournment of congress in the following August, the house of representatives made an amendment to the army appropriation bill, providing that no part of the army should be employed to enforce the laws made by the territorial legislature of Kansas, until congress should have decided that it was a valid legislative assembly. The senate refused to concur in this proviso, and congress adjourned without making any provision for the support of the army. The president immediately issued a proclamation calling an extra session to convene on Aug. 21, when the army bill was passed without any proviso, and immediately afterward congress adjourned. It came together again on Dec. 1, and the president's annual message was chiefly devoted to the subject of Kansas, and in its citation of events and expressions of praise it took strong grounds against the free-state party of the country. The session closed on March 3, 1857, and on the following day the administration of President Pierce terminated, and that of James Buchanan commenced. Mr. Pierce soon afterward visited Madeira, and travelled extensively in Europe, from which he returned in 1860. On April 21, 1861, he made a speech to a mass meeting at Concord, N. H., in which he declared himself in favor of the Union against the southern confederacy, and urged the people to give to the national administration a cordial and vigorous support.—The life of Franklin Pierce, to the period of his nomination as candidate for the presidency, has been written by Nathaniel Hawthorne (Boston, 1852).

PIERCE, George Foster, D.D., one of the bishops of the Methodist Episcopal church, South, born in Greene co., Ga., Feb. 3. 1811. He was graduated at Franklin college in 1829, and afterward began to study law, but resolving to become a preacher, was admitted on trial into the Georgia conference at Macon in 1830. With the exception of the year 1834, during which he was stationed in Charleston, S. C., he labored in the regular ministry in various parts of his native state until 1838-'9, when he became first president of the Georgia female (now Wesleyan) college in Macon. While here he edited jointly with P. Pendleton the "Southern Lady's Book." In 1848 he was elected president of Emory college, Ga., and continued in that office until his election to the episcopacy at the general conference in Columbus, Ga., in 1854.

PIERER, Heinrich August, a German publisher, born in Altenburg in 1794, died May 12, 1850. In 1811 he studied medicine at Jena, and in 1813 joined the army, rose to the rank of major, and resigned in 1831. He took charge of his father's publishing house in 1835, and completed the *Encyklopädisches Wörterbuch* (26 vols., Altenburg, 1824–'36), commenced by his father, and afterward published a new edition, entirely recast (1840–'46). His two sons, Victor and Eugene, continued in the management of the establishment, and published a 3d edition of the encyclopedia under the title of *Universal Lexikon* (20 vols., Altenburg, 1849–'54). A 4th edition commenced in 1857 is not yet completed.

PIERPONT, John, an American poet and clergyman, born in Litchfield, Conn., April 6, 1785. He was graduated at Yale college in 1804, and in 1805 went to South Carolina as private tutor in the family of Col. William Allston. He remained there 4 years, spending part of his time in Charleston and part on the Waccamaw near Georgetown. Returning to Connecticut in 1809, he studied law in the school at Litchfield, and having been admitted to practice at the bar of Essex co., Mass., in 1812, settled at Newburyport, where he delivered before the Washington benevolent society his poem of "The Portrait," included in the collection of his "Patriotic and Political Pieces." Relinquishing the profession of law, which, in consequence of the unsettled state of affairs caused by the war, was by no means lucrative, he went into mercantile business, first in Boston and then in Baltimore, but was unsuccessful. In 1816 he published at Baltimore "Airs of Palestine," a poem in heroic measure, and soon after began the study of theology, first by himself and subsequently in the Harvard theological school. In 1819 he was ordained minister of the Hollis street Congregational church in Boston. He spent a part of 1835–'6 in Europe, extending his travels to Constantinople and the ruins of Ephesus. He had been, both in the pulpit and out of the pulpit, an active laborer in behalf of temperance, anti-slavery, the melioration of prison discipline, and other reforms. The freedom with which he expressed his opinions, especially in regard to the temperance movements, had given rise to some feeling before his departure for Europe, and in 1838 there sprang up between himself and a portion of his parish a controversy which lasted 7 years. At the end of that time a dismissal was requested by Mr. Pierpont, who had triumphantly sustained himself against the charges of his adversaries. In 1845 he became the first pastor of the Unitarian church in Troy, N. Y., where he remained 4 years, when he accepted a call from the first Congregational church in Medford, Mass., at which place he now resides. In 1840 he published an edition of his poetical works under the title of "Airs of Palestine and other Poems." At the Litchfield centennial celebration of 1851 he delivered a long poem. Many of his poems have been called forth by circumstances connected with the moral and religious movements of the times.

PIETISM. See German Theology, vol. viii. p. 194.

PIGEON, an extensive family of rasorial birds, by some ornithologists raised into an order, characterized by a short, straight, compressed bill, with the apical half vaulted and strong, and the base comparatively weak and covered with a fleshy membrane in which the nostrils are placed; wings moderate; tarsi more or less long and robust, and the toes long, divided, and padded beneath. Most pigeons are perchers, and this family may be regarded as forming the connecting link between the gallinaceous and insessorial birds. Their geographical distribution is very extensive, species being found in every part of the world except in the frigid zones; but their favorite habitats are tropical S. Asia and the islands of the Indian archipelago. They generally nest on trees, laying 2 whitish eggs on which both sexes sit in turn; the young are covered with a thin hairy-like down, and are fed in the nest till able to fly, at first by a milky half-digested substance disgorged by the old birds. The flight is generally rapid and powerful, and capable of being long sustained, as in the carrier pigeon; in the more rasorial types the wings are shorter and rounded, and the flight is abrupt, low, and of short continuance. They are generally wild and timorous, and, with the exception of the common pigeon and turtle dove, have not been domesticated. The voice consists of a guttural cooing, at times plaintive and tender, at others harsh and unpleasant, and is mostly confined to the males in the breeding season; the colors are usually brilliant and beautifully diversified; their flesh is wholesome, nutritious, well flavored, juicy, and high-colored. In the American fauna pigeons take the place of partridges and pheasants. The family includes the sub-families *columbinæ* or pigeons proper, *treroninæ* or tree pigeons, *gourinæ* or ground pigeons, *didunculinæ* or tooth-billed pigeons, and *didinæ*, of which the dodo, already described, is the only representative.—In the *columbinæ* the bill is moderate and slender, and acute at the tip; the nostrils a longitudinal slit; wings moderate and pointed; tail of various lengths, generally rounded; tarsi short, toes long, hind one about the length of the tarsus. In the typical genus *columba* (Linn.) the prevailing color is bluish gray, of different shades, with feathers of a peculiar form and metallic lustre upon the neck; their feet are formed for walking as well as perching, and they generally seek their food upon the ground; they eat principally grains, acorns, and other nuts, and some tender leaves and plants. There are more than 30 species scattered over the globe; generally seen in pairs in summer, they collect in large flocks at the beginning of winter, sometimes migrating during the latter to milder climates; they are fond of rocky places, especially on the coasts of Great Britain, Africa, and Asia, where they build their rudely constructed nests. The common pigeon or dove, too well known to need description, is derived from the wild rock pigeon or biset (*C. livia*, Linn.); in its wild state it lives in caverns and holes in the rocks of the coast, and never in the woods or upon trees; it swarms about the Orkney islands and the Hebrides and on the rocky islands of the Mediterranean. Man substitutes an artificial dove cot for the natural cavern, in which the pigeons rear their young for his benefit; the birds, however, generally depend for support on their own exertions, and enjoy so perfect a freedom of action that they can hardly be said to be domesticated. This species may be known from the wood and ring pigeons by the 2 broad and distinct black bars across the closed wings, the white of the lower part of the back, and the broad black bar at the end of the tail. It is beyond doubt that this is the species known to the ancients, and which from time immemorial has been regarded with peculiar affection by mankind, as the emblem of gentleness, affection, and the divine love and mercy; it was the dove which was sent forth as a messenger from the ark and returned with the olive branch in its mouth, the harbinger of glad tidings; it was one of the purest sacrificial offerings under the Mosaic dispensation, and to the Christian world it has always represented the Holy Spirit descending to bless mankind; from the affectionate intercourse between the sexes, it was sacred to Venus, the heathen goddess of love, and was her constant attendant. The pigeon is interesting to the comparative physiologist from the fact, above alluded to, that the parent birds nourish the young with the curd-like contents of the crop, secreted by special glands like the milk in mammalia, with this remarkable difference, that it is secreted by both sexes, and even most abundantly by the male. It was discovered by Hunter that the crop, thin and membranous in the ordinary condition, becomes thickened and enlarged in the breeding season, more vascular, with an irregular glandular appearance on the interior; the secretion of these glandulæ soon coagulates into a granulated white curd, so that the old joke about "pigeon's milk" is not without foundation; a young pigeon, like a young mammal, will surely die if deprived of its parents in the first week of its life. Pigeons do not drink in the manner of ordinary birds, but by a long, continuous draught, without raising the head until the thirst is satisfied, like cattle. There are numerous varieties or breeds highly prized by the pigeon fancier; whatever their form, colors, or peculiarities, they have all originated from a few accidental varieties of the common species, isolated and carefully bred by man, and not from hybrid crossings with other species either allied or remote; these varieties, as far as known, are permanent when bred in and in, and, if permitted to breed indiscriminately with each other, produce a fertile offspring. Such varieties require the utmost care to keep them from degenerating, and have so far lost their natural instincts and desire for liberty that they have become nearly dependent on man for their support, having in great measure lost the faculty of providing for themselves. Among the numerous varieties of this species may be mentioned the fantail, Jacobine, pouter, tumbler, and carrier pigeon, the last of which has been described under that title. The fantails are so called from the great number of the tail feathers, their erectile power and singular trembling motion; they are of small size, awkward fliers, and very apt to be overset by the wind; when pure the color is generally white, sometimes with a black head and tail. The Jacobine pigeon has a ruff of raised feathers forming a kind of hood like that of a monk; it is small, but of light and elegant form, with white head, wings, and tail, and reddish brown hood, back, and breast; some highly prized varieties are pure white; it is very prolific, a poor flier on account of its hood, and generally keeps much at home. The pouter or cropper is so called from its faculty of inflating the œsophagus to an extent sometimes equal to the size of the body; this inflation subjects the bird to many inconveniences, diseases, and fatal accidents, and hence, though of handsome plumage, it is not much esteemed by fanciers; it is also unproductive; the prevailing color is reddish brown. The tumbler is so called from its singular habit of rolling over and over in the air before alighting; the Turkish pigeon, of the same race as the carrier, is of large size, with a bill tuberculated at the base, and the eyes widely surrounded by naked red skin. The cushat or ring pigeon (*C. palumbus*, Linn.) is widely distributed over Europe and N. Asia and Africa, even where the winters are severe; it is an arboreal species, perching, roosting, and nesting upon trees, keeping a vigilant watch in the daytime; the eggs are 2, white, and hatched out in 17 or 20 days; 2 broods are raised in a year. It is a large species, measuring 16 or 17 inches in length; the sides of the neck are glossed with green, bounded by a patch of white which nearly meets behind, forming a half collar; the breast and abdomen purplish red, with the outer ridge of the wing and some of the greater coverts white. The wood pigeon (*C. œnas*, Linn.) is of smaller size, and of more limited distribution, found principally in well wooded districts, migrating to the south in winter; its habits resemble those of the ring pigeon; it is about 14 inches long, with an alar extent of 26; the general color is bluish gray, with the sides of the neck golden green, the fore neck and breast pale vinous, and the outer web of the secondaries and some of their coverts with a spot of black, not forming bars as in the rock pigeon. Neither of the last two species has been domesticated, and neither will breed with the rock pigeon, nor with their own species in captivity. There are several wild species of *columba* in the United States, as the band-tailed pigeon (*C. fasciata*, Say), about 15 inches in length, found from the Rocky mountains to the Pacific, and as far south as Mexico; the color above is olivaceous ashy, the head and lower parts purplish violet, a white half collar on the back of the neck, tail with a subterminal dusky band, sides of neck with golden reflections, and the bill yellow with a black tip. The red-billed pigeon (*C. flavirostris*, Wagl.), of the lower Rio Grande, is 14 inches long and 22 in alar extent; the general color is slaty blue, with the back olive, and the head and neck chocolate red; bill during life purple, yellow after death; no metallic scales on the neck. The white-headed pigeon (*C. leucocephala*, Linn.), a little smaller, inhabits the Indian and other southern Florida keys and the West Indies; the color is dark slaty blue, with the top of the head white, the sides of the neck with golden green scales, the bill purplish, iris white, and legs dark red.—The passenger pigeon (*ectopistes migratorius*, Swains.) has been described under that title. In the genus *carpophaga* (Selby), including the fruit pigeons, the bill has a large and prominent soft basal portion, beneath which the nostrils are situated; the 2d, 3d, and 4th quills nearly equal and longest; tail lengthened and generally rounded; tarsi very short, and clothed with down below the knee. There are about 30 species, found in the forests of India, Australia, and the islands of the Indian and Pacific oceans; they live on the branches of the highest trees, feeding on fruits and berries; their colors are green, yellow, and purple, with bronzed and metallic reflections. One of the handsomest of this beautiful group is the nutmeg pigeon (*C. ænea*, Selby), about 18 inches long, inhabiting India and its archipelago; the general color is a fine pale bluish gray, with golden green back, wings, and tail, and deep chestnut under tail coverts. The magnificent fruit pigeon (*C. magnifica*, Temm.) has the wing coverts spotted with bright yellow, a purplish green tinge on the breast and abdomen, and the rest of the lower parts rich yellow; in these and the allied species the metallic lustre of the plumage changes with every motion, rivalling even the hues of the humming birds. They feed on nutmegs, figs, and in Australia on the top leaves of the cabbage palm; the nutmegs are swallowed whole, the external envelope or the mace digested, and the hard nut voided not only uninjured but the better prepared for germination in the soil on which it is dropped; in this way the nutmeg has been extensively disseminated through the East Indian islands; it has been found by experiment that an artificial preparation by steeping in a lye of lime, analogous to what it undergoes in the intestines of the pigeon, is necessary to cause germination in the nutmeg. On this food the flesh becomes very fat and highly flavored. The double-crested pigeon (*lopholaimus antarcticus*, Shaw), a native of New Holland, has an occipital crest and one of loose feathers occupying the forehead and basal half of the bill; the wings are very long; the general color is pearl-gray, the crests reddish brown, the tail with a black bar; it is strictly arboreal, gregarious, living in the forests, feeding on the wild figs and the fruit of the cabbage palm. The genera *turtur* and *œna* of this sub-family will be noticed under TURTLE DOVE.—In the sub-family *treroninæ* or tree pigeons belong the genera *ptilonopus* (Swains.) and *treron* (Vieill.) or *vinago* (Cuv.); in these the bill is short, with the tips of both mandibles of nearly equal thickness, the tarsi very short and more or less feathered, and the toes divided at the base, with short and curved claws. In the genus *ptilonopus* or the turtelines the bill is slender, the wings moderate, the 3d quill the longest, and the 1st with the end suddenly narrowed for some distance, and the tail moderate and even. These showy birds are found in the tropical deep forests of India, Australia, and the Pacific islands; they are of solitary habits, feeding on fruits, especially that of the banyan. The purple-crowned turteline (*P. purpuratus*, Swains.) is about 10 inches long, of a parrot-green color above, paler on the sides; forehead and crown pale lilac bordered with yellow; middle of abdomen rich orange passing into pure yellow; under tail coverts orange; scapulars purplish blue; quills greenish black margined with yellow. In the blue-capped turteline (*P. monachus*, Swains.) the prevailing color is green, with the forehead, crown, and abdominal patch brilliant blue; line over the eyes, the chin, throat, and vent bright yellow. In the genus *treron* the bill is stout, the 2d and 3d quills nearly equal and longest, with the 3d notched on the inner web near the middle; tail rounded, or lengthened and wedge-shaped; there are about 20 species, inhabiting India and its archipelago and Africa; they are arboreal, wild, living in flocks, and feed on fruits and berries; the flight is rapid and low. These thick-billed pigeons vie with the parrots in the diversified colors of their plumage, the prevailing hues being green and yellow, with purplish and reddish patches. The aromatic vinago (*T. aromatica*, Steph.), of continental India, Java, and the neighboring islands, is of a general yellowish green color, with a mantle of rich brownish red, crown greenish gray, chin and throat yellow, wings greenish black edged with yellow, tail bluish gray with dark central band, the 2 middle feathers wholly green; this and the allied species luxuriate amid the rich foliage of the banyan and other tropical trees, whose fruits yield them a never-failing repast; their colors are so nearly those of the leaves among which they dwell, that it is very difficult to detect them; their feet resemble those of a parrot, and they climb among the branches very much like this scansorial bird.—In the *gourinæ* or ground pigeons the toes are usually long and strong, and adapted for progression on the ground; the wings generally short and rounded, and sometimes concave as in the partridges, and the legs are long; approaching as they do the gallinaceous birds in these respects, they differ from them in having, like the other doves, very short cæca; they run with great rapidity, but the flight is low and labored; the colors are more uniform and less brilliant than in the preceding sub-families, though some of the members are very handsome birds. The genus *columbina* (Spix) has a short slender bill, and lengthened rounded tail, and contains a few pretty little species from the warm parts of South America. The genus *zenaida* (Bonap.) has longer wings and a shorter tail; the species are few, and these small pigeons are chiefly confined to the West India and Galapagos islands, whence they sometimes wander to the Florida keys; they seek their food on the ground, and when alarmed fly off with a whistling noise. The Zenaida dove (*Z. amabilis*, Bonap.) is about 11 inches long and 18 in alar extent; the prevailing color above is reddish olive tinged with gray, with a purplish hue on the head and under parts; inside of wings and sides blue; quills brown, secondaries tipped with white, and the tail with a subterminal black bar. The keys skirted with mangroves used to be their favorite breeding places, hence called pigeon or dove keys; the nest is made on the ground, and more compact than is usual with pigeons; the flesh is excellent; the food consists of seeds, aromatic leaves, and berries, some of which are acrid and poisonous to man; the cooing is very soft and melancholy. The white-winged dove (*melopelia leucoptera*, Bonap.) has the orbital region naked; the color is light olive brown above, purplish on the head and neck, and bluish gray below; tail broadly tipped with white, and a broad white patch of the same on the wings; it is found in the West Indies, and from the valley of the Rio Grande southward. In the genus *chamæpelia* (Swains.) are included other small ground pigeons from South America and Africa. The scaly dove (*C. squamosa*, Temm.; *scardafella*, Bonap.) is about 8 inches long; the color is ashy olive above, and ashy white below tinged with pale violet on the breast, the dark brown margins of the feathers giving the bird a scaly appearance; it is found from the valley of the Rio Grande southward. The ground dove (*C. passerina*, Swains.) is 6¼ inches long; above grayish olive, the neck and occiput tinged with blue; lower parts and sides light purplish red, some of the feathers margined with darker; quills brownish orange, and wings marked with black, steel-blue, and violet blotches; female without the purplish red; it is found along the S. Atlantic and gulf coasts, and in Lower California. In the genus *peristera* (Swains.) the bill is very slender, and the tail moderate and rounded; there are about 20 species found in the tropical parts of South America, the West Indies, S. Africa, and the South sea islands; their flight resembles that of the partridge. The white-bellied ground dove (*P. Jamaicensis*, Swains.) is about 12 inches long; the upper plumage is pale umber brown tinged with green, the lower parts white tinged with vinous red on the breast; forehead and throat hoary white, and sides of neck vinous red with lilac purple and golden green reflections. The Key West pigeon (*P. Martinica*, Temm.; *oreopeleia*, Reich.) is often called mountain partridge in the West Indies; it is about 10¼ inches long; the upper plumage is brownish orange with a purple or coppery gloss; reddish white below, passing into pale wood brown; it is found in Florida and the West Indies. In Australia belong the genera *ocyphaps* (Gould), with long wings and tail, and an occipital crest; *petrophassa* (Gould), in the rocky and barren N. W. districts; *phaps* (Selby), very handsome birds, living like partridges; *geophaps* (Gould), and *chalcophaps* (Gould), found also in the Indian archipelago. These are generally showy birds, and have similar terrestrial habits. In the genus *calænas* (Gray), the bill is strong and much curved at the tip, wings long and pointed, and tail moderate and even; tarsi very robust; base of upper mandible covered with a wattle, and feathers of the neck long. These birds inhabit the Indian archipelago, running on the ground with great quickness, and perching on the lower branches of trees. The Nicobar pigeon (*C. Nicobarica*, Gray) is one of the most beautiful of the family in its colors, though its heavy body, pendent tail, and concave wings show its affinity with rasorial birds; it is about 15 inches long; the plumage is rich metallic green, changing with the light into golden, coppery, and purplish red; the tail is pure white, and the quills blackish blue with greenish reflections. In the genus *verrulia* (Flem.) belongs the carunculated pigeon of S. Africa (*V. carunculata*, Flem.); the bill is slender, the wings long, and the tail short; there is a pendulous wattle under the throat, and a naked hanging band on the sides of the neck; it comes in these respects the nearest to the *gallinæ*, and also, like the preceding genus, lays 6 or 8 eggs instead of the usual 2 of the pigeons, and the young immediately follow their parents, who keep them together by a peculiar cry; the food consists of grain, berries, and insects; the upper parts are gray, with a purple tinge on the head and neck; the under parts white, and the tail reddish brown. In the genus *starnænas* (Bonap.) belongs the blue-headed pigeon (*S. cyanocephala*, Bonap.) of the West Indies and the southern keys; above and on the sides the color is olivaceous chocolate, and below reddish brown; chin, throat, and forehead black; crown blue; it is about 10¾ inches long; it is retired and solitary, and lays several eggs in a nest on the ground; the young are said to follow the parents as soon as hatched. In the genus *goura* (Flem.) belong the large crowned pigeons of New Guinea and the Indian archipelago; the head is ornamented with a large compressed crest. The crowned pigeon (*G. coronata*, Steph.) is the largest of the family, being 27 or 28 inches long; the bill is 2 inches long and black; the crest is composed of long silky barbules plumed at the end, which, with the head, neck, and lower parts, are grayish blue; back with the feathers black at the base with tips of rich purplish brown; a central broad white bar across the closed wings. This bird seems to connect the pigeons with the curassows and guans; it nests in trees, and lays only two eggs; it is readily tamed, but, like the gaudy Nicobar pigeon, does not propagate in confinement, and can hardly bear the chilly temperature of northern climates; its flesh is excellent for food. This species and the *G. Victoriæ* have hybridized at the London zoological gardens, and have produced a living young one, having sat upon a single egg for 28 days.—The sub-family *didunculinæ* have the bill strong and nearly as long as the head, with the culmen depressed close to the forehead, and then suddenly rising and forming an arch to the acute and overhanging tip; the lower mandible is armed with 3 distinct angular teeth near the truncated tip; the wings moderate and concave, and the bend armed with a blunt tubercle; the tail short and rounded; tarsi moderate and strong; all the toes long, and with sharp curved claws; bare space around eyes and on each side of throat. The only genus is *didunculus* (Peale), and the only species *D. strigirostris* (Gould), found in the Samoan islands; it is about the size of a common pigeon, of a general blackish glossy green color, with chestnut back and tail, brownish quills, and orange bill. Its wings indicate a considerable power of flight, and it is said to pass most of its time on trees, feeding on berries and fruits; it also seems adapted for movement on the ground, and its bill is suited to digging up bulbous roots or stripping the husks from nuts. They are generally seen in pairs or small flocks; the nest is made among rocks, and the young are born naked and helpless; the flesh is excellent; they are kept as pets by the natives. This is an interesting bird, as showing a living connection of the pigeons with the extinct dodo; many of its characters also bring it near gallinaceous birds, especially the curassows.

PIGEON HAWK, a small bird of prey of the falcon sub-family and genus *hypotriorchis* (Boie), which differs from *falco* (Linn.) in its longer and more slender tarsi, covered in front with large hexagonal scales, and very long and slender toes. There are more than a dozen species scattered over the world, of which the two most common European representatives have been described under Hobby and Merlin; they prefer wooded cultivated districts, and usually follow in the train of the small migratory birds on which they prey; the flight is rapid and long sustained; the nest is made on trees or among rocks, and the eggs are from 3 to 5. The American pigeon hawk (*H. columbarius*, Gray) is 12 to 14 inches long and 26 in alar extent; the male is smaller than this. The adult bird has been described by Audubon as the little corporal hawk (*F. temerarius*); its general color is bluish slate, every feather with a longitudinal black line; forehead and throat white; below pale yellowish or reddish white, each feather with a longitudinal line of brownish black; the tibiæ are light ferruginous, with black lines; quills black, with ashy white tips; tail light bluish ash, tipped with white, with a wide subterminal black band and several narrower bands of the same; cere and legs yellow, and bill bluish; the younger birds are dusky or blackish brown above, and the tail has 4 to 6 white bands; the variations in plumage, according to age and locality, are considerable. It is found over all temperate North America, Central, and the N. of South America; it breeds in the north. It is the boldest of any hawk of its size, pouncing on thrushes, wild pigeons, woodpeckers, snipe, and even teals, but preying chiefly on birds of the size of the red-winged blackbird and sora rail; it has been known to attack cage birds in the porches of houses in crowded cities. According to Dr. Brewer, the eggs measure about 1¾ by 1¼ inches, and are nearly spherical; the color is not a very clear white, and there are a few bold irregular dashes of light yellowish brown, chiefly about the smaller end; the nest is coarsely constructed of sticks and mosses, resembling that of a crow.

PIGMY, or Pygmy (Gr. πυγμαῖος, from πυγμή, the fist, or a measure extending from the elbow to the fist, equal to 13½ inches), the name of a fabled nation of dwarfs said to be only 3 spans high, and believed in by the ancients from an early date as inhabiting the interior of Africa, where they were supposed, according to Juvenal, to wage continual war with the cranes. Herodotus (ii. 32) speaks of them, and, like all who have copied him, probably confounded in his account men and the cynocephalous apes of Africa. Dr. Krapf, a missionary, has recently revived these stories with reference to the Dokos, a tribe of E. African negroes to the south of Shoa and Kaffa. (See Dokos.)—The term pigmy has in the United States been applied by some writers, ignorant of anatomy, to a race whose remains have been found in the valley of the Mississippi. The enclosures containing these bones are made of 6 pieces of rough sandstone or limestone, 18 to 24 inches long, 18 deep, and 16 wide; the bodies are placed with the shoulders and head elevated and the knees raised toward the face, in a reclining or sitting posture, with various ornaments and cooking utensils; the total length of the skeletons has been from 3 to 4½ feet. According to Dr. S. G. Morton, the separable condition of the cranial sutures, the character of the changing dentition, and the absence of union of the epiphyses of the long bones, show that these supposed pigmies were only children, from 6 to 10 years of age, of the American Indian race, whose bodies for unknown reasons were buried apart from the adults of their tribe.

PIGNEROL. See Pinerolo.

PIKA (*lagomys*, Cuv.), a genus of the family *leporidæ*, including the tailless hares. They have no visible tail, the ears are short and rounded, the hind legs short, and the molars $\frac{5-5}{5-5}$; the skull is very flat, dilated behind, the interorbital space contracted, the supraorbital processes absent, the orbits directed upward, and the malar bones extending backward nearly to the opening of the ear chamber; there is one principal opening in the nasal process of the superior maxillary bone; the zygomatic arch is remarkably short; the coronoid process of the lower jaw a mere tubercle, and the mental foramen situated near the middle of the ramus; the principal upper incisors have a deep vertical groove on the outer side, and terminate in 2 points with a notch at the end; the lower incisors simple; the upper molars as in the hares, the lower with a deeper outer groove; there are generally small naked pads at the end of the toes, the rest of the feet densely clothed with fur. The pikas are of small size, the largest not exceeding a Guinea pig; they are found only in alpine or subalpine districts, where they live in burrows or among loose stones, remaining quiet by day and feeding at night; the food consists of herbage of different kinds, which they store up in little piles in autumn for winter consumption; when feeding they often utter a chirping or whistling noise. The alpine pika (*L. alpinus*, Cuv.) is about 9½ inches long, with long and soft fur, grayish next the skin; general color above grayish brown, yellowish gray below; feet pale, with a yellowish tinge; the ears margined with white; it inhabits Siberia from the river Irtish to Kamtchatka. The pigmy pika (*L. pusillus*, Desm.), from southern Siberia and the Ural mountains, is 6¾ inches long, of a general brownish tint pencilled with black and brownish yellow; feet and under parts yellowish white. Other species are found in the mountainous districts of Hindostan, some of them 6,000 or 8,000 feet above the sea. The Rocky mountain pika (*L. princeps*, Rich.), or little chief hare, is about 7 inches long; the general color is grayish above, penciled with black and yellowish white; yellowish brown on the sides, and dirty yellowish white below. It is found along the Rocky mountains from lat. 42° to 60° N.; it frequents heaps of loose stones, coming out after sunset. Pallas describes the polar pika (*L. hyperboreus*, Wagn.), the smallest known species; it is only 5½ inches long, grayish brown above, tinged with rufous on the head and sides; it is from N. E. Siberia. There are 3 or 4 fossil species described from the osseous breccia and the pliocene of Europe.

PIKE (*esox*, Linn.), the common name of the soft-rayed abdominal fishes, whose single genus now constitutes the family *esocidæ*. Their headquarters are in North America, only one species being found in Europe and temperate Asia; they are confined to fresh water and to the northern hemisphere. The body is elongated and scaly; there is a single dorsal, generally opposite the anal; there is no adipose fin; the upper jaw is formed principally by the intermaxillaries; the mouth is large and well furnished with teeth; there are several covered glandular accessory branchiæ, the number of branchiostegal rays varying from 8 to 18; swimming bladder simple; stomach siphonal, intestine short and without cæca; under the skin are vascular ramifications, peculiar to the family. According to Agassiz, the cylindrical elongated form indicates a low position among the abdominal fishes, as also does the mouth, the maxillaries being without teeth while the palate bones are powerfully armed; the intermaxillaries and the maxillaries are in one arch, as in the salmon family; the skeleton, and especially the skull, is remarkably soft. The common pike of Europe (*E. lucius*, Linn.) rarely exceeds 3 feet in length or a weight of 12 or 20 lbs.; some have been described considerably beyond these, but most are below them; the head is elongated and flattened, the lower jaw considerably the longer; the gape very large; the head and upper back dusky brown, becoming lighter and mottled with green and yellow on the sides, passing into silvery white below; pectorals and ventrals pale brown, other fins darker, mottled with white, yellow, and green; iris yellow. Young pikes, or pickerels, are of a greenish hue, and the colors vary much at all ages. The pike inhabits most of the rivers and lakes of Europe, and was long ago introduced into Great Britain, where it is now exceedingly common; from the 13th to the 15th century it was so rare in England that the price was fixed by law, and generally a much higher one than for salmon or turbot. The pike is a very strong, active, and fierce fish; it darts from its reedy cover with extreme velocity, swallowing other fish, water rats, and even small aquatic birds; Lacépède calls it the shark of the fresh waters, sparing not its own species and devouring its own young, and tearing in its gluttonous fury even the remains of decomposing carcasses. Its size, strength, swiftness, and daring render it a tyrant dreaded by all the inhabitants of lake and river. Wonderful stories have been told regarding the gigantic size and extreme longevity of the pike, and we can readily conceive that it may attain a weight of 40 or 50 lbs. and an age of 100 years, where food is abundant and anglers absent. Its flesh is well flavored and easy of digestion. Cuvier, Richardson, and others have asserted that this species occurs also in the great American lakes; but on the general principle that the animals of America and Europe, with the exception of the arctic fauna, though nearly allied, have not been found to be identical species, this may be reasonably doubted; the fish described from America as *E. lucius* is probably the first of the species noticed below, or else one of the many as yet undescribed.—The common lake pike of America (*E. estor*, Lesueur) attains a length of 3 feet; the back is deep greenish brown, the sides with numerous rounded and oblong pale yellowish spots, and the abdomen white; the fins are reddish yellow, marbled with blackish and deep green, the caudal large and lunated; it is found in the great northern lakes. The muscalonge or maskinonge (*E. nobilior*, Thompson) of Lake Champlain is a larger and rarer fish, and much better for the table, always commanding a higher price than the lake pickerel, though the latter is often erroneously called muscalonge; the lower half of the cheek is without scales, which is not the case in *E. estor*. Mr. Thompson (in his appendix to the "History of Vermont," 1853) spells the name *masquallonge*, deriving it from *masque* (face) and *allongé* (elongated), an epithet given to it and other pikes by the French Canadians. This may be distinguished from the lake pickerel by the nearly black color of the back, the bluish gray sides with dark brown rounded markings, its grayish white abdomen tinged with ruddy, its more robust proportions, shorter head, flatter face, and wider jaws; it attains a length of more than 4 feet and a weight of 40 lbs. Agassiz describes a pike of large size from Lake Superior, in his narrative, under the name of *E. boreus*. The common pike of the northern states, the long or shovel-nosed pickerel (*E. reticulatus*, Lesueur), attains a length of 1 to 2 feet; the colors vary in different localities, but in most the body is green above and golden yellow on the sides, with irregular dark longitudinal lines united into imperfect reticulations; lower parts white, flesh-colored on the throat; a black vertical band beneath the eye; dorsal and caudal fins greenish black, the others flesh-colored. This is everywhere valued for the table, and is caught at all seasons of the year, even through the ice; it is taken generally with a hook, baited with a frog's leg, small fish, or any white substance moved rapidly over the surface of the water; it is also speared through holes in the ice, or from boats to which it is attracted by bright lights. It is a very rapid swimmer, voracious, and strong; like other species it remains apparently motionless in the water watching an opportunity to dart upon its prey, which consists of any fish which it can possibly swallow, the spiny perch in most cases excepted; while the body remains suspended, there is an incessant motion of the few last rays of the dorsal and anal fins, especially the *former*, with a rotary movement of the pectorals, and occasionally of the ventrals and caudal; these forces maintain such an exact equilibrium that the fish does not move in the water. The trout pickerel, or short-nosed pickerel (*E. fasciatus*, De Kay), is commonly somewhat smaller; the general color is dark greenish, with about 20 narrow blackish brown bands, not forming a network; the throat stained with fuliginous; the body is proportionately stouter and the snout shorter than in the preceding species. This species is found generally in the pickerel weed or in water bushes (*cephalanthus occidentalis*); it is taken at all seasons of the year, but rarely in the deep water channel like the long-nosed species; it takes the bait eagerly, and makes back into the shallow coverts whence it darted; it bites at any time of day, and whether the bait be at or beneath the surface, moving slow or fast; it is more voracious, if possible, than the *E. reticulatus*, an individual being frequently landed after having been several times drawn partly out of water; it has been known to take the hook with the tail of a half digested fish visible in its mouth. Any one who has seen pickerel dart upon fish in an aquarium, and witnessed the force with which they strike the bottom, will perceive what an admirable fender the prominent lower jaw makes; it is frequently much lacerated by violent contact with the bottom, without the upper jaw suffering at all.—The name of pike is sometimes given to the long-jawed marine fish of the allied genus *belone* (Cuv.); in this the head and body are very much elongated, the latter covered with very minute scales; the long jaws are straight, narrow, pointed, and armed with numerous small teeth. The *B. truncata* (Lesueur), called the long-jawed or gar pike, is from 1 to 2 feet long, of a light greenish color above and silvery beneath, with a dark band extending from above the pectorals to the origin of the dorsal; the body is slender, and the head flattened; the dorsal is situated on the posterior fourth of the body, highest in front and rapidly decreasing toward the caudal; the anal shaped like the dorsal, and opposite to it. It is found in the southern New England and the middle states. The European sea pike (*B. vulgaris*, Cuv.), or mackerel guide, so called from its preceding the latter to shallow water to spawn, is about 2 feet long; it is abundant on the coasts of northern Europe, and is taken in the spring; it is also used as bait; the flesh resembles that of the mackerel, but is drier, and the bones are greenish. It is an active fish, swimming near the surface, and often springs out of water. The color above is dark greenish blue, lighter on the sides, and silvery below; dorsal and caudal greenish brown, and other fins white.

PIKE, the name of counties in 10 of the United States. I. A N. E. co. of Penn., separated from N. Y. and N. J., which there form an angle, by the Delaware river, and drained by Lackawaxen and Shohola creeks; area, about 600 sq. m.; pop. in 1860, 7,155. It has a rough, hilly surface, and indifferent soil, with forests that yield large quantities of timber. The productions in 1850 were 38,609 bushels of Indian corn, 16,874 of oats, 52,059 of potatoes, 3,546 of wheat, 3,519 lbs. of wool, and 90,517 of butter. There were 4 grist mills, 29 saw mills, 5 tanneries, 5 churches, and 955 pupils attending public schools. The N. part is traversed by the Delaware and Hudson canal, and the New York and Erie railroad passes along the N. E. border. Capital, Milford. II. A W. co. of Ga., bordered W. by Flint river and drained by Big Potato, Elkins, and other creeks; area, about 400 sq. m.; pop. in 1860, 10,090, of whom 4,723 were slaves. It has an uneven surface and moderately fertile soil. The productions in 1850 were 418,990 bushels of Indian corn, 46,442 of oats, 85,556 of sweet potatoes, and 8,002 bales of cotton. There were 8 grist mills, 5 saw mills, 4 tanneries, 2 newspaper offices, 28 churches, and 554 pupils attending public schools. It is intersected by the Macon and western railroad. Capital, Zebulon. III. A S. E. co. of Ala., bordered E. by Pea river, and drained by the Conecuh river and its branches; area, about 1,200 sq. m.; pop. in 1860, 24,436, of whom 6,785 were slaves. Its surface is undulating, much of it covered with pine; the soil is not very fertile. The productions in 1850 were 531,192 bushels of Indian corn, 151,657 of sweet potatoes, and 5,679 bales of cotton. There were 2 grist mills, 2 saw mills, 8 tanneries, 18 churches, and 498 pupils attending public schools. Capital, Troy. IV. A S. co. of Miss., bordering on La., and drained by Bogue Chitto river and its branches; area, about 850 sq. m.; pop. in 1860, 11,135, of whom 4,935 were slaves. The productions in 1850 were 245,751 bushels of Indian corn, 27,366 of oats, 61,040 of sweet potatoes, 290,550 lbs. of rice, and 4,128 bales of cotton. There were 6 grist mills, 7 saw mills, 2 tanneries, 15 churches, and 458 pupils attending public schools. Capital, Holmesville. V. A S. W. co. of Ark., drained by the Little Missouri river and its branches; area, about 600 sq. m.; pop. in 1860, 4,025, of whom 227 were slaves. It has a hilly surface and fertile soil. The productions in 1854 were 96,915 bushels of Indian corn, 3,756 of wheat, 5,750 of oats, and 429 bales of cotton. Capital, Murfreesborough. VI. A co. of Ky., in the extreme E. corner of the state, bordering on Va., drained by the West fork of Big Sandy river; area, 400 sq. m.; pop. in 1860, 7,384, of whom 97 were slaves. It has a hilly surface, the Cumberland mountains extending along the S. E. border and a spur partly along the S. W. There are extensive beds of bituminous coal. The productions in 1850 were 198,764 bushels of Indian corn, 2,454 of wheat, 18,501 of oats, 12,058 lbs. of wool, and 4,401 of tobacco. There were 10 churches, and 180 pupils attending public schools. Capital, Pikeville. VII. A S. co. of Ohio, intersected by the Scioto river and drained by several branches; area, about 425 sq. m.; pop. in 1860, 13,643. It has a diversified surface and fertile soil. The productions in 1850 were 797,655 bushels of Indian corn, 16,725 of wheat, 67,788 of oats, 23,475 lbs. of wool, and 121,597 of butter. There were 4 grist mills, 12 saw mills, 3 tanneries, 47 churches, and 1,478 pupils attending public schools. It is intersected by the Ohio canal. Capital, Piketon. VIII. A S. W. co. of Ind., bordered N. by White river and drained by Patoka and S. Patoka creeks; area, 337 sq. m.; pop. in 1860, 10,183. It has a gently undulating surface and a generally fertile soil. The productions in 1850 were 407,281 bushels of Indian corn, 15,128 of wheat, 27,394 of oats, 16,991 lbs. of wool, and 733 tons of hay. There were 10 grist mills, 4 saw mills, 2 tanneries, 14 churches, and 375 pupils attending public schools. It is intersected by the Wabash and Erie canal. Capital, Petersburg. IX. A W. co. of Ill., separated from Mo. on the S. W. by the Mississippi river, bounded E. by the Illinois, and drained by McKee's, Bay, and Little Muddy creeks; area, about 750 sq. m.; pop. in 1860, 27,249. A lateral channel of the Mississippi, called Snycartee slough, traverses the county. It has a rolling surface, about equally divided between forest and prairie, and the soil is very fertile. It contains large quantities of coal. The productions in 1850 were 1,375,045 bushels of Indian corn, 194,051 of wheat, 130,267 of oats, 38,450 lbs. of wool, and 119,741 of butter. There were 12 grist mills, 8 saw mills, 2 weekly newspapers, 16 churches, and 3,241 pupils attending public schools. Capital, Pittsfield. X. An E. co. of Mo., separated from Ill. by the Mississippi river, intersected by Salt river, and drained by several creeks; area, about 700 sq. m.; pop. in 1860, 18,420, of whom 4,056 were slaves. The productions in 1850 were 748,540 bushels of Indian corn, 106,241 of wheat, 85,060 of oats, 44,405 lbs. of wool, and 348,830 of tobacco. There were 17 grist mills, 8 saw mills, 6 tanneries, 2 weekly newspapers, 31 churches, and 2,730 pupils in public schools. Capital, Bowling Green.

PIKE, Albert, an American poet, born in Boston, Dec. 29, 1809. According to his own account, his father was "a journeyman shoemaker, who worked hard, paid his taxes, and gave all his children the benefit of an education." When he was 4 years old the family removed to Newburyport, and in the district schools of that town and in an academy at Framingham he received his early education. At the age of 16 he entered Harvard college; but being unable to support himself in Cambridge, he became assistant teacher and subsequently preceptor of a grammar school in Newburyport. Afterward he taught successively an academy at Fairhaven and a private school in Newburyport. In the spring of 1831 he started for the West and South. Arriving at St. Louis, after having gone much of the way on foot, he set out with a company of 40 on an expedition to Mexico, and reached Santa Fe on Nov. 28, where he remained a year, engaged part of the time as a merchant's clerk and part of the time in peddling. In Sept. 1832, he left Taos with a company of trappers, and, after a visit to the head waters of the Red and Brazos rivers, separated with 4 others from the party, travelled 500 miles on foot, and reached Fort Smith in Arkansas, "without a rag of clothing, a dollar in money, or knowing a person in the territory." The following winter he spent in teaching, and in July, 1833, he began a school, which he was soon forced to give up on account of sickness. In the mean time he had written several poems for the "Arkansas Advocate," a newspaper published at Little Rock, which so pleased the editor that he gave Pike an invitation to become his partner. The offer was gladly accepted, and in this position he remained until 1834, when he bought the whole establishment. He continued to edit the paper until 1836, but meanwhile studied law and was admitted to the bar, after which he devoted himself entirely to that profession. A little before this he had published in Boston a volume of "Prose Sketches and Poems," in which he gave an account of some of his journeys. The "Hymns to the Gods," published subsequently, were composed at an earlier period, while he was teaching school at Fairhaven. Several fugitive poems of his have also appeared in periodicals, and in 1854 a collection of his poetry, including the "Hymns to the Gods," was printed at Philadelphia under the title of "Nugæ," but was never published. Mr. Pike has been a prominent man in the political movements of the South-West, acting there with the state rights party. During the Mexican war he served with distinction as a volunteer.

PIKE, Zebulon Montgomery, an American general, born in Lamberton, N. J., Jan. 5, 1779, killed in the attack upon York (now Toronto), Canada, April 27, 1813. His father was an officer in the U. S. army, and the son, early embracing the same profession, entered his father's company, then serving on the western frontier, and rose to the rank of lieutenant. He was at the same time a diligent student, and acquired a knowledge of the Latin, French, and Spanish languages. After the United States purchased Louisiana, Pike was sent on an expedition to explore the sources of the Mississippi and the surrounding territory. He left St. Louis Aug. 9, 1805, at the head of 20 men, provisioned for 4 months; but his journey lasted nearly 9 months, during which he suffered greatly from inclement weather and scarcity of food. Two months had not passed by after his return when he was sent by Gen. Wilkinson on a similar expedition to the interior of Louisiana.

Here winter overtook the party, and for weeks they suffered from cold and hunger. At last, after 3 months' march, they made their way to what they supposed was the Red river, but were taken prisoners by a body of Spanish cavalry, who informed them that they were in Spanish territory and on the banks of the Rio Grande. After an examination before the commandant-general of the province of Biscay, Pike was released and sent home, arriving at Natchitoches July 1, 1807. He received the thanks of government, and was made successively captain, major, and in 1810 colonel of infantry. In that year he published an account of his two expeditions, illustrated by several original maps and charts. At the beginning of the war of 1812 he was stationed on the northern frontier, was appointed in 1813 brigadier-general, and was selected to command the land forces in the expedition against York, the capital of Upper Canada. He sailed from Sackett's Harbor April 25, arrived at York April 27 at the head of 1,700 men, and commenced the landing under a heavy fire. After carrying one battery he was about to assault the main works, when the British magazine exploded, and Pike was mortally wounded by a heavy stone. He was carried to the commodore's ship. In his last moments the British flag was shown him; making a sign to place it under his head, he expired.

PIKE'S PEAK, a peak of the Rocky mountains, in the territory of Colorado, lat. 39° N., long. 105° W., named in honor of Gen. Z. M. Pike, who discovered it in 1806. Its height is variously given at from 12,000 to 14,500 feet above sea level. The ascent, which is made from Colorado City, is extremely difficult, passing over rugged hills, and along the precipitous walls of narrow *cañons*, which abound in cascades and picturesque views. No route has yet (1861) been found by which horses or mules can approach from the E. within 8 miles of the base. In ascending, the transition is extremely abrupt from a dense pine forest to the bare, open mountain side, with no vegetation except beds of grass among the rocks. Near the summit, blossoms of faint yellow mingled with purple spring from the ground in great profusion, so near banks of snow that one may pluck flowers with one hand and gather snow in the other. Two enormous gorges extend from the top almost to the base, one of them visible to the naked eye at the distance of 80 miles. The summit is nearly level, embracing about 60 acres, and composed of angular slabs and blocks of coarse, disintegrating granite. It affords one of the grandest views on the North American continent, extending nearly 100 miles in all directions, embracing the great plains on the E., and on the N., S., and W. a vast expanse of mountains, of diverse forms and varying colors, including several transparent, sparkling lakes, and the sources of 4 great rivers, the Platte, Arkansas, Rio Grande, and Colorado of California. Directly W., and thousands of feet below, are the South park, a crescent-shaped section of smooth, treeless prairie, 40 miles by 16 in extent, and other fields of rich floral beauty, enclosed by rugged mountain walls. In the gorges near the summit snow is perpetual.—The mountain has furnished the popular name for the Rocky mountain gold region, not yet fully explored, but embracing portions of the original territories of Kansas, Nebraska, New Mexico, Utah, and Oregon. For many years vague reports and traditions of gold in this region had been current among trappers and Indians. In 1857 a party of civilized Cherokees made the first organized attempt to explore it, but were driven back by hostile savages. In 1858 a company from Georgia, and another from Lawrence, Kansas, reported that they had discovered gold in paying quantities in the valleys near the base of Pike's peak, though subsequent investigations have not developed any remunerative diggings within many miles of that mountain. On May 6, 1859, rich deposits of gold were found in the mountains on the head waters of Clear creek, 50 m. N. of Pike's peak; and from that day the country has been settled with great rapidity. In Aug. 1860, its population was 60,000, and two months later there were 175 quartz mills in the mountains, about one half of them in operation, at an outlay of $1,800,000. The gold yield of 1860 was estimated at $4,000,000. In the vicinity of Clear creek, near the original discoveries, quartz mining is the leading occupation, and the gold-bearing quartz is found in great abundance, while 100 m. further S. gulch mining is largely carried on. The gold is found exclusively in the mountains. Its northern limit, as far as yet discovered, is in the Wind River mountains, and its southern in the San Juan mountains of New Mexico, more than 500 m. apart; but a great portion of the intervening country has not yet been examined. Silver ore is found in large quantities W. of the South park, on both sides of the dividing ridge; but its quality has not been sufficiently tested to demonstrate the practicability of mining it. Iron, lead, coal, and other minerals have also been found. The auriferous quartz exists in lodes, running N. E. and S. W.; and the geology of the region differs radically from that of California and Australia.—The climate is healthy and agreeable, and the winters are mild, though with occasional periods of 2 or 3 days in which the cold is intense, and the mercury sometimes descends to 20° below zero. Changes of temperature are much more sudden and severe than on the Atlantic coast, but lung diseases are almost entirely unknown. The elevation of the valley regions is about 5,000 feet above the sea; the atmosphere is peculiarly clear and invigorating, and so dry that fresh meat cut in strips and exposed to it will cure sufficiently, without salting or smoking, to be carried to any part of the world. No rain falls, except during about 7 weeks of the late summer and early autumn. The mountains are densely wooded with pine, spruce, fir, cedar, and aspen.

The ascent of the dividing ridge is in many places very gentle; and near Breckinridge waters which run to the Atlantic gush from the ground within 500 yards of springs which feed a tributary of the Pacific. Several passes through the mountains have been found, which offer no engineering obstacles to the construction of a railroad so serious as those which have been already overcome in the Alleghanies. The great American desert extends to the base of the mountains, which rise abruptly like a wall on its western border. With the exception of the narrow valleys of the streams, it consists of vast wastes of sand, destitute of tree or shrub, and characterized by numerous varieties of the cactus, aspen, withered grass, stunted shrubs, and alkaline waters, often poisonous to both cattle and men. The streams sometimes sink abruptly from view, leaving a dry bed of sand above, and run underground for many miles, when they again gush up as suddenly as they disappeared. Antelopes, wolves, prairie dogs, and rattlesnakes abound in the desert, and elk and grisly and several other species of bears in the mountains. The soil of the valleys appears to consist of pure sand; but with ample irrigation it produces wheat, barley, and root crops in great abundance. Some flour is brought from New Mexico and Salt Lake, and other supplies from the Missouri river. The transportation of all the imports from 300 to 700 miles, in wagons drawn by oxen and mules, renders the expenses of living more than 100 per cent. higher than on the Missouri river. The principal tribes of Indians are the Arapahoes and Utes. The latter are sometimes hostile, but easily held in check by the whites.—The region abounds in natural features of peculiar interest, which, whenever a railway connection is obtained, must render it a popular summer resort. Among these are Pike's and Long's peaks, the North, Middle, and South parks, the Monument region, and numerous hot and cold mineral springs. The Monument region comprises a large section along Monument creek, abounding in natural stone monuments, standing upright in picturesque and fantastic forms. The predominant shape is that of gravestones, which, interspersed with numerous pine groves, give it the appearance of a great cemetery. Two miles from Colorado City they culminate in the "Garden of the Gods," or "Red Rocks," which rise perpendicularly 350 feet, forming a most impressive spectacle. At one point they have been reft asunder to the base, leaving a natural gap or carriage way. Near them are the famed boiling fountains (Fontaine qui Bouille), which gush up with great force, and are so strongly impregnated with soda that they have incrusted the adjacent rocks with deposits of it to the thickness of several inches. Flour mixed with their waters, without the addition of any other substance, forms peculiarly light bread; and they are alleged to possess rare medicinal qualities. The Indians regard these fountains with awe and reverence, as the abode of a deity who "troubles the waters." The Arapahoes formerly strewed the ground with tomahawks and knives, and hung the trees with quivers and moccasons, as propitiatory offerings to the spirit of the place.—Denver is the metropolis of the Pike's peak region, and is a well built town of 6,000 inhabitants. A bill was passed by congress in Feb. 1861, to organize the region into a territory under the name of Colorado, bounded N. by lat. 40° N., E. by long. 102° W., S. by lat. 37° N., and W. by the Green and Colorado rivers.

PILATE, Pontius, the Roman officer or ruler of Judæa under whom Christ suffered. The nature of his office is not well understood. In the Greek Testament he is called *ἡγεμων*, which King James's and the Rhemish versions translate "governor;" Philo Judæus and the Greek fathers style him *επιτροπος*; Josephus both *επιτροπος* and *ἡγεμων*, and Tacitus *procurator*. He was the 6th Roman incumbent of that office, succeeding Valerius Gratus, A. D. 25 or 26, under the reign of Tiberius, and retaining the post 10 years. Josephus relates several acts of injustice which he committed during his government, and he was finally disgraced in consequence of his cruelty to the Samaritans, a number of whom he caused to be massacred for a slight disturbance excited by his oppressions. The Samaritans complained to Vitellius, the proconsul of Syria, who ordered Pilate to repair to Rome to answer the accusation. Tiberius was dead before his arrival, but according to Eusebius the disgraced procurator was banished to Vienne in Gaul, where he committed suicide about A. D. 38.—It can hardly be doubted, after the testimony of several ancient writers, that Pilate transmitted to the emperor Tiberius a memorial of Christ's actions and death; but the "Acts" and "Letter" which now exist under his name are universally regarded as spurious.

PILCHARD, a fish of the herring family, and genus *alosa* (Cuv.). It is about as large as a herring, but rounder and thicker, and with larger scales; it differs principally from the herring (*clupea*) in having a deep notch in the centre of the upper jaw. It is the *A. pilchardus* (Val.), from 9 to 11 inches long, bluish green above, on the sides and below silvery, the dorsal fin and tail dusky, the cheeks and gill covers tinged with golden yellow and with variously radiating striæ; the mouth small and without teeth. It feeds on shrimps, minute crustaceans, and the roe of fish. It occurs in immense numbers on the coasts of Cornwall and Devonshire, from July until Christmas; it is caught, principally at night, in large perpendicular nets, one end of which is sunk to the bottom by weights and the other kept afloat by corks; as many as 1,200 hogsheads have been taken in a single fishing, and the average annual product in Cornwall is over 20,000 hogsheads, containing about 60,000,000 individuals; the fish are removed by smaller nets in such quantities as the curers desire, and are preserved in the same way as herring, after which they are considered the next best food. This fishery employs about 9,000 persons, and a capital of more than $1,000,000; the fishermen are in the habit of saying, and with truth, that the pilchard is "the least fish in size, most in number, and greatest for gain, taken from the sea." A favorite way of eating them is in a pie, with the heads of the fish protruding through the crust. This species is also abundant on the coasts of Brittany, Spain, and Portugal, and is of great value to their Roman Catholic populations.

PILE, a post of timber or of iron driven into the ground, either upon the land or under water, to serve as a foundation of any structure. In their most simple form piles are the straight bodies of trees pointed at one end and banded at the other to protect this from the shattering effect of the blows by which they are driven down. The lower end is also sometimes shod with an iron socket terminating below in a point; and within a few years past these have been made in the form of a screw, so that by turning the pile at the head it is screwed down into the muddy or sandy bottom. Piles used upon the coast survey are made like a wedge at the point, and along the lower third of the stick portions of the wood are cut away so as to leave the remainder in the form of successive inverted frusta of cones, each about 2 feet long, set one upon another. Thus shaped, the pile tends to bury itself in the sand with the oscillation of the sea. Piles are driven by machines called pile drivers, the action of which is the fall of a heavy block of iron raised to a considerable height by a windlass turned by men, horses, or steam power. A variety of machines in use for this purpose are described in "Appleton's Dictionary of Machines, Mechanics," &c., under the head of "Pile Drivers."

PILES. See Hæmorrhoids.

PILGRIMAGE (Lat. *peregrinus*, a traveller), a journey undertaken from devout motives to some holy place. The history of pilgrimages belongs chiefly to the middle ages, though even from the earliest Christian times the faithful used to visit Judæa for the purpose of witnessing the places consecrated by the life and sufferings of Jesus Christ. The practice was regarded not only as a quickener of devotion, but as a most acceptable satisfaction for sin, and was frequently assumed as a penance. After Constantine had built a church over the site of the holy sepulchre, the number of pilgrims vastly increased; and on the dedication of the church of the Resurrection at Jerusalem in the 31st year of that emperor's reign, an immense concourse of people is said to have been present from all parts of Christendom. The empress Helena, in the course of the pilgrimage which she made to Palestine, caused churches to be built in nearly all the places associated with the prominent events in the life of Christ. Nazareth and Mount Tabor were among the places thus distinguished, and soon became the resorts of great numbers of worshippers. Neither the hostility of the pagans in the reign of the emperor Julian, the ravages of the Goths, Huns, and Vandals, nor the conquest of Jerusalem by the Arabs had any perceptible effect in checking these perilous journeys. The most illustrious persons thought it no shame to take up the scrip and staff and journey on foot from the most distant countries of Europe to the banks of the Jordan. During the 10th and 11th centuries the failure to perform some pilgrimage was looked upon almost as a mark of impiety. Whoever had escaped a great danger, triumphed over an enemy, obtained the object of special prayers, or committed a great sin, went to give thanks or pray for pardon at some spot consecrated by religious traditions. A father devoted his infant child to pilgrimage, and it was the first duty of the youth when he grew up to fulfil the vow. Often a dream was interpreted as imposing an obligation to go on a pilgrimage, and still more frequently the journey was imposed by the church in lieu of the ancient canonical penances. Pilgrims were everywhere received with hospitality. Many of them carried neither money nor arms, but each was obliged to show, as a sort of passport, a letter from his prince or bishop. His departure and return were celebrated by religious observances. On his setting out the pilgrim received from his priest a scrip and staff together with a coarse woollen gown marked with a cross; he was sprinkled with holy water and accompanied by a procession as far as the next parish. When he arrived at the holy city he first prepared himself by fasting and prayer, and then visited the sepulchre covered with a robe which he afterward preserved to be buried in. He viewed Mount Zion, the Mount of Olives, the valley of Jehoshaphat, Bethlehem, Mount Tabor, and all the places associated with the miracles of Christ; and having bathed in the Jordan, he gathered in the territory of Jericho a palm branch, which on his return home he presented to his priest to be laid upon the altar in token of the completion of his enterprise. It is from this circumstance that the pilgrims to Palestine are called palmers. Next in merit to pilgrimage itself was providing for the safety and comfort of the pilgrims. Hospitals and monasteries were built for their reception along the most frequented routes and in the city of Jerusalem, and Christians established there exposed themselves to great dangers in order to go and meet them on the road. Female pilgrims were received by religious communities of their own sex. The merchants of Amalfi, Venice, and Genoa, and the princes of the West bore most of the expense of supporting these hospitals, and every year monks of Palestine came to Europe to collect alms for the same purpose. The Mohammedan caliphs treated the pilgrims alternately with cruelty and kindness; but under the Seljookian Turks, who conquered Palestine in 1078, they were subjected to violent persecution. About this time the archbishop of Mentz, with the bishops of Bamberg, Utrecht, and Ratisbon, undertook a pilgrimage to the Holy Land, and the multitude of their followers amounted to 7,000 persons, of whom fewer than 2,000 reached home again in safety. A few years later the miseries of the pilgrims and Christian inhabitants of Jerusalem gave rise to the crusades, which may be considered as armed pilgrimages on a large scale. (See CRUSADES.) In the mean time these pious journeys had not been without practical results. Beside relics of saints and precious remains of Christian antiquity, the pilgrims brought back the silks, gems, and other products of the East; French and Italian merchants established warehouses in Jerusalem, and every year on Sept. 15 a fair was opened on Mount Calvary, where the Franks and Moslems exchanged their goods.—Pilgrims however did not confine themselves to Judæa. Some travelled as far as Egypt, where Christ passed his infancy, and penetrated to the solitudes of Memphis and the Thebaid, inhabited by the disciples of St. Anthony and St. Paul, the first hermit. In Europe there was no province without a shrine of some martyr or apostle. The tombs of Saints Peter and Paul at Rome were reckoned only less sacred than Palestine, and Loretto on the E. coast of Italy was famous for the Virgin Mary's house, believed to have been miraculously transported thither from Nazareth. Treves in Prussia is celebrated for the supposed coat without seam worn by the Saviour, and said to have been deposited by the empress Helena in a building which now forms part of the cathedral of St. Peter and St. Paul in that town. The first historical mention of this relic is in 1190. It was exhibited in 1810, and again in 1844, when in the space of 8 weeks it was viewed by as many as 1,100,000 pilgrims. The celebrated shrine of Santiago de Compostela in Spain, where the bones of St. James the apostle were said to have been deposited, was visited by immense numbers of pilgrims from all parts of Europe, and in the 13th or 14th century there was written in England a guide book entitled "The Way from the Lond of Engelond unto Sent Jamez in Galiz." The pilgrims who came hither mounted some steps to the image of the saint in the cathedral and kissed it, after which they received certificates called *compostellas*. They took away with them, as tokens of the visit, some of the scallop shells with which the city of Santiago still abounds. In France the favorite shrine was that of the archangel Michael at Mont St. Michel in Normandy. The mountain is a sharp isolated peak crowned by a church and convent, now used as a prison. For ages it was visited yearly by thousands of devotees, and the records of the convent contain the names of more than a dozen kings who have paid their devotions here. The principal place of pilgrimage in England was Walsingham in Norfolk, where at a monastery of Augustinian or Black canons there was a chapel of the Virgin, with a famous statue. There was scarce a person of any note in England who did not at some time or other send a rich present or pay a visit to Our Lady of Walsingham, and the offerings of gold, silver, and precious stones accumulated there were of almost incredible value. Erasmus has given some account of the pilgrimages to this shrine in his colloquy entitled *Peregrinatio Religionis ergo*. The image was destroyed at the dissolution of the monasteries in 1538. Another popular devotional resort was to the shrine of Thomas à Becket at Canterbury, where as many as 100,000 pilgrims are said to have been registered at one time, and the offerings at the altar of the saint amounted in one year to nearly £1,000, while those at the principal altar were only a few pence. The pilgrimage to Canterbury, though not more popular than that to Walsingham, is more familiar to the modern reader through the "Canterbury Tales" of Chaucer. Pilgrims also resorted to Glastonbury abbey in considerable numbers, and also to some lesser shrines in England. Ireland abounded in holy places, the most famous of which was probably St. Patrick's Purgatory, a cave situated in a small island in Lough Derg, county Donegal. Up to a very recent period from 10,000 to 15,000 pilgrims used to resort to it at a certain time every year, but within a few years the Roman Catholic clergy have forbidden the practice. The Russians have several places of pilgrimage. They resort to the monastery of Mount Athos to pay their devotions to Our Lady of Iberia. Kiev is venerable for its caverns full of the bones of those who suffered for their faith under the Tartars. The Laura of the Holy Trinity, about 40 m. from Moscow, contains the uncorrupted body of St. Sergius, and that of St. Alexander Nevskoi near St. Petersburg has the relics of the saint whose name it bears. At the monastery of the New Jerusalem near Moscow the pilgrims behold in the plan of the edifices a close copy of the holy city, with its principal churches and chapels exactly reproduced. Though the custom of pilgrimage in Russia as in all other European countries is falling into disuse, it is still not entirely extinct.—In the East it flourishes in full vigor. Among the Mohammedans the pilgrimage most in repute is that to Mecca. (See HADJI.) The favorite shrines for the Persians are Musjid Ali, the burial place of the caliph Ali, which is resorted to by the Sheeah sect; and Kerbela, where Hossein, son of Ali by Mohammed's daughter Fatima, was slain, visited chiefly by the sect of Ali. The Persians also make visits to Mecca and Medina. In Hindostan there are innumerable holy places to which devotees resort, the most celebrated of which are Juggernaut, Benares, Hurdwar, Dwarka, and Nassick. The pilgrimages are generally at festivals lasting several days, a part of the time being passed in religious rites, a part in amusements, and a part in business. Thieving, lewdness, and all forms of villany are then especially rife. Some of the pilgrims lose all their means and have to beg their way home; others resort to such places for the purpose of ending their existence, for it is believed that those who die at certain of these holy spots are exempt from future suffering and metempsychosis. Many of the devotees in proceeding on a pilgrimage prostrate themselves on the ground at every step, repeating each time the name of the god or the place to which they are going. The Mongols have a strong taste for pilgrimages, and their country abounds with places of great reputed sanctity, generally Buddhist monasteries, to which at certain times vast crowds are attracted. A rite greatly in vogue at such times consists in making the circuit of the monastery in a series of prostrations, the body being extended at full length and the forehead touching the ground at every step. As the monasteries with their outbuildings are often very large, it is frequently difficult to accomplish the feat in a single day. The Japanese of the Sinto sect make pilgrimages to a famous temple in the province of Isje, which every one is obliged to visit at least once in his life. The journey is made generally in the spring and on foot. Other devotees, usually in companies of 2 or 3, travel about the empire to visit the 33 chief Quanwon temples. They are dressed in white after a peculiar fashion, and obtain their bread by singing from house to house, many of them having no other occupation, but passing their lives in perpetual pilgrimage. In the coldest weather pilgrims may be seen journeying to certain temples with no other covering than a little straw about their waists. They receive no charity, live very poorly, and run nearly all the distance. The Sinai of the Japanese Buddhists is the mountain of Foosee or Fooseeyama near Yeddo, and a yearly pilgrimage to it is the duty of every one.

PILL, in medicine, a preparation of drugs in small globular masses of convenient size for swallowing. In this form medicines that are very disagreeable in the taste, and those which by their insolubility cannot be given in the liquid form, are most conveniently administered. Many drugs may be at once rolled into the form of pills; others of soft or liquid consistency require to be incorporated with dry and inert powders, as wheat flour, starch, gum arabic, crumbs of bread, &c.; while powders must be mixed with soft bodies, as soap, sirups, honey, mucilage, and the like. A mixture of sirup and powdered gum arabic is much used, and is preferable to mucilage as less likely to become dry and hard. Water is often added to soften the mass, and some fixed oil is also recommended, for the purpose of keeping the pills soft for a long time. In preparing pills, the materials are to be thoroughly mixed and incorporated together into what is called the mass. Portions of this are then rolled with a spatula into cylinders of uniform diameter throughout, and from these the pills are divided in equal sizes either by the eye or by the use of graduated divisions upon a tile, and they are then rolled one by one into globular form. A machine is much used by which a cylinder can be rolled out between two flat surfaces and then between two ribbed surfaces of the same apparatus be completely cut up into pills, which require no further rolling. To prevent pills from adhering together they are dusted over with sifted arrow root, powdered licorice root, or lycopodium. Methods have also been introduced of coating them with a solution of gelatine, and also of collodion. They have beside been covered with gold or silver leaf, and also coated with sugar to disguise the taste of their ingredients. The use of materials that would prevent the action of the gastric juice upon the pills should be avoided; and pills should also be prevented from becoming dry and hard.

PILLAR. See Column.

PILLARS OF HERCULES. See Gibraltar.

PILLNITZ, a village of Saxony, situated on the right bank of the Elbe, 7 m. S. E. from Dresden; pop. about 600. In its palace the emperor Leopold II., Frederic William II. of Prussia, and some other princes met in Aug. 1791, and concerted the preliminaries of a coalition to oppose the progress of the French revolution, and enforce the right of the Bourbons to the throne of France.

PILLORY, an instrument of punishment, consisting of a wooden frame erected on posts, having holes in it through which the head and arms of the culprit were thrust, in which position he remained for a certain time exposed to the view of the public. It existed in France, where it was anciently called *pillorie*, and in more modern times *carcan*, from the iron collar used to fasten the neck of a criminal to a post; in Germany, where it went under the name of *pranger;* and in England even before the Norman conquest, where it was called *healsfange*, or more correctly *halsfang* (catch-neck). By the "statutes of the pillory" passed in the reign of Henry III., the punishment was employed for such crimes as forestalling, using deceitful weights, perjury, and forgery. According to the form of the judgment, the criminal was to be set in or upon the pillory. Its use was abolished in all cases except perjury in 1816, and altogether in 1837. In like manner, when the penal code of France was revised in 1832, the *carcan* was abolished. The length of time during which the culprit was exposed in the pillory was sometimes defined by law, but was more usually left to the discretion of the judge.

PILLOW, Gideon Johnson, an American general, born in Williamson co., Tenn., June 8, 1806. He was graduated at the Nashville university in 1827, studied law at Columbia and

Nashville, and having been admitted to the bar commenced the practice of his profession at Columbia. In 1844 he was sent as a delegate to the democratic national convention at Baltimore, where he exerted an active influence in favor of the nomination of James K. Polk, whose election he also advocated with great earnestness in the subsequent canvass. In July, 1846, war having been declared against Mexico, he was made a brigadier-general, and set out for the seat of war in command of a brigade of Tennessee volunteers. When Gen. Taylor marched upon Monterey, Gen. Pillow was placed in command of a brigade stationed at Camargo, and remained there until the early part of 1847, when he was ordered to join the army sent to invade Mexico at Vera Cruz, under Gen. Scott. He marched his brigade to Tampico, there embarked, and landed with the main army near Vera Cruz on March 9. He shared actively in the investment and siege of that city, and when the Mexicans made known their readiness to capitulate, he was appointed one of the commissioners to negotiate the terms of the surrender. At the battle of Cerro Gordo, April 18, he was assigned to the duty of assaulting the right wing of the Mexican army. That part of the enemy's line was more strongly fortified than was supposed when the battle was planned, and the attack was met with a destructive fire from batteries concealed behind a thick growth of bushes and some felled trees. In this engagement Gen. Pillow was wounded, though he remained in active command until the battle was over. Soon after this battle he was promoted to the rank of major-general. The 12 months for which the volunteers had enlisted being about to expire, it was determined not to march them any further. While new recruits were arriving, Gen. Pillow made a short visit to Tennessee. Returning to Mexico about the middle of June, 1847, he took command of a large force at Vera Cruz, destined for the interior. On July 8 he reached Gen. Scott's head-quarters at Puebla. In August he moved forward with the main army for the valley of Mexico, and took part in the battles of Churubusco, Chapultepec, and Molino del Rey. After the conclusion of the war, he became involved in a serious controversy with Gen. Scott, by whom he was arrested upon charges of insubordination and misdemeanor, and was tried by a court martial and acquitted. He then retired to private life, and has since devoted his time to the management of his large estate. In 1850 he was a member of the Nashville southern convention, where he delivered a speech against the extreme ground taken by ultra southern men. In April, 1861, he offered to raise a large force in Tennessee in aid of the secession cause in the more southern states.

PILON, Germain, a French sculptor, born at Loué, near Le Mans, about 1515, died in Paris in 1590. He executed a mausoleum of Cardinal Guillaume du Bellay, in the cathedral of Le Mans; the sculptures of the monument to Henry II. in the cathedral of St. Denis; the mausoleum of Chancellor de Biragne, still preserved in the museum at the school of fine arts in Paris; and the "Three Graces," now in the Louvre, bearing the likenesses of Catharine de' Medici, the duchess d'Étampes, and Mme. de Villeroy, reputed the handsomest women of their time.

PILOT. In some maritime countries of Europe this word was formerly, and is to some extent even now, used to designate an officer of a vessel who had the charge of the ship's course. By general usage the term is now applied to a person not belonging to a ship, who conducts it into or out of a harbor, or over shoals, or wherever the navigation requires superior local knowledge. The office is one of great importance, and is regulated by law in most civilized countries. The English statutory provisions on this subject are to be found in the merchants' shipping act, 1854, 17 and 18 Victoria, c. 104, §§ 330–388. In the United States an act of congress authorizes the several states to make their own pilotage laws; and such laws have been accordingly enacted by all the seaboard states. These laws generally provide for the appointment of commissioners who are invested with power to make all needful rules and regulations on the subject. While a pilot is on board a vessel within the pilot grounds, he has the control of it, and is answerable for any injury which may happen to it through his fault; and this liability was carried to such an extent by the early maritime law of some European countries, that the pilot, if unable to render full satisfaction, atoned for his negligence with his life. While the pilot is on board the power of the master of the vessel is not wholly superseded. It is his duty, in case of obvious and certain disability, or dangerous ignorance or mistake on the part of the pilot, to dispossess him of his authority. So it is the duty of the master to see that a lookout is kept; and generally, while the orders of the pilot are imperative as to the course the vessel is to pursue, the management of it is still under the control of the master. The pilot is the servant of the owner of the vessel, and the latter is generally liable to third persons for any damage resulting from his negligence or fault. But if, as when a vessel is entering a port, the master is obliged to take the first pilot that offers, or pay a certain amount, it would seem that such taking is by compulsion, and that the owner should not be liable for his acts. This is the settled law in England, but the question is still an open one in the United States.

PILOT FISH, a scomberoid fish of the genus *naucrates* (Raf.). It is characterized by a fusiform body, small uniform scales, a keel on the side of the tail, the dorsal composed of isolated spines, and the ventrals under the pectorals; the head is compressed, the teeth thin and crowded on the jaws and palate, and the branchiostegal rays 7; some free spines in front of the dorsal and anal fins. There are 4 species, of which the best known is the *N. ductor* (Raf.), the famous pilot fish of navigators; it is about a foot long, shaped like a mackerel, of a silvery gray color, bluish on the back, with 5 dark blue bands encircling the body. This species attends vessels for long distances, like the sharks in the water and the petrels in the air, for the sake of the bits of food thrown overboard; this may account for the strange fellowship of this fish with the sharks, the former, as the wonderful stories of sailors go, at one time leading its cartilaginous companion toward, and at another away from the baited hook; these species seem to be on good terms with each other, but probably have a common object in view, the obtaining of food, the smaller being too nimble for the greater, like the jackals which follow the lion, and the attendants on the birds of prey; Meyen thinks that the pilot fish feeds upon the excrements of the shark. It inhabits the Mediterranean and the Atlantic, following vessels into the tropics and even to the coasts of America; its flesh is said to be very good. The stories about its leading vessels in their proper course and through dangerous passages, for which it was held sacred by the ancients, are mere fables. On the American coast is described the *N. Noveboracensis* (Cuv.), with 4 transverse bands and 4 spines before the dorsal; it has been seen on the New England and New York shores.

PILOT KNOB. See Iron Mountain.

PILOT MOUNTAIN. See Ararat.

PILPAY. See Bidpay.

PILSEN, New, a town of Bohemia, and capital of a circle of the same name, at the confluence of the Bradlaska with the Beraun, a tributary of the Moldau, 52 m. S. W. from Prague; pop. 10,000. It is situated in the midst of a fertile valley, and is fortified and well built. A railway connects it with Prague, and it ranks as one of the most important commercial towns of the kingdom, having large annual fairs, a thriving transit trade with Bavaria, and manufactures of woollen goods, morocco, iron ware, horn ware, alum, &c. It contains a military academy, a lyceum, a gymnasium, a philosophical institution, and a theatre. Among the most interesting public buildings are the town hall, the house of the Teutonic knights, and the cathedral of St. Bartholomew. The last is a fine Gothic edifice of the 13th century, with a steeple 190 feet high, and several good paintings, and is supposed to have been built by the Teutonic knights. About 5 m. S. E. is the small market town of Old Pilsen, with about 2,000 inhabitants.

PIMENTO. See Allspice.

PIMOS, an Indian tribe of New Mexico, in the valley of the Gila. They are neighbors of the Coco-Maricopas, whom they resemble so much in person and manners that they are not easily distinguished from them. Their number may be estimated at 2,700. Their complexion is dark brown, differing from that of the redskins E. of the Rocky mountains and the olive-featured Indians of California. The men have slender forms, but the women, who do most of the hard labor, are well made. Agriculture is their principal occupation. They are the most civilized of any of the North American Indians; they manufacture cotton fabrics, pottery, and other useful articles with considerable skill, and enjoy a reputation for simplicity of character, peacefulness, and honesty. They show a courageous spirit however on occasion, and are frequently at war with the Apaches. Their habitations are built of stakes interwoven with straw, corn husks, or rushes, and plastered over with mud, and are generally grouped together in villages of from 20 to 50. The men have no clothing except a breech cloth, and occasionally a blanket, or such odds and ends as they pick up from American travellers; the women wear a blanket or other cloth tucked about the waist and hanging to the knee. The only weapon used by the tribe is the bow and arrow. They possess horses and cattle, but very few mules. (See Coco-Maricopas, and Pueblo Indians.)

PIN, a bit of wire, sharp at one end and furnished with a head at the other, used chiefly for the toilet for temporarily securing portions of the dress, and generally by seamstresses and tailors for fastening their work together. The need of little utensils of this sort has been met from ancient times by various devices. In the Egyptian tombs they are found much more elaborate and costly than the pins of the present time. They vary in length up to 7 or 8 inches, and are furnished sometimes with large gold heads, and sometimes with a band of gold around the upper end, those of the latter kind having probably been used for securing the hair. The ancient Mexicans found in the thorns of the agave convenient substitutes for metallic pins; and even the English, up to the middle of the 16th century, made use of rude skewers of wood, though they also made others of gold, silver, and brass to serve as pins. To that time they had depended upon the manufacturers on the continent for their supplies of the better sorts of pins, and this importation appears to have been established previous to 1483, when it was interrupted by a prohibitory statute. In 1543 an act of parliament provided "that no person shall put to sale any pins but only such as be double-headed and have the head soldered fast to the shank of the pin, well smoothed, the shank well shaven, the point well and roundly filed, canted, and sharpened." Within 3 years from this time the manufacture was so much improved that the statute was of no importance. In Gloucester the business of pin making was introduced in 1626, and soon proved so prosperous that it gave employment to 1,500 persons. It was established in London in 1636, and afterward in Birmingham, which became the chief seat of this and other manufacturing operations of similar character. In the United

States the manufacture was first undertaken soon after the war of 1812, when in consequence of the interruption to commerce the value of a paper of pins was not less than $1, and these were of very inferior quality to those now worth only 6 cents a paper. The first attempt was made by some Englishmen at the old state prison, in what was then called Greenwich village, now a part of New York city. The enterprise was soon abandoned, and was again undertaken with the same tools in 1820 at the Bellevue almshouse, but again without success. In Massachusetts during the war a new machine was invented for facilitating the process, but little or nothing was done in the manufacture of pins. In 1824 Mr. Lemuel W. Wright of Massachusetts patented in England, and introduced in a factory at Lambeth, London, some important machines of his invention, the first ever contrived for making solid-headed pins. The company however failed before these pins were introduced into the market, and the machinery was transferred to Stroud in Gloucestershire, where the manufacture was conducted by D. F. Taylor and co., and the first solid-headed pins were sold by this firm in London about the year 1833. In 1832 the new machines of Mr. John I. Howe of New York were patented in the United States. These were for making the pins with wire or "spun heads" like those imported from Europe, and were no doubt the first self-acting machines, in which the pin was entirely completed by one process, that proved successful. In 1836 they were put in operation by the Howe manufacturing company at their factory constructed for this purpose in New York. Their operations were transferred to Birmingham, Conn., in 1838, and soon included the new process of making pins with solid heads patented by Mr. Howe in 1840. Another factory was established in 1838 at Poughkeepsie on the Hudson river, by Messrs. Slocum, Gellson, and co., making use of processes invented by Mr. Samuel Slocum for producing the solid-head pin; but their interests were finally transferred to the "American Pin Company," at Waterbury, Conn., where the business has for a number of years been successfully carried on in connection with the manufacture of hooks and eyes, which are also made of brass wire. The improved processes, among other favorable results, have materially diminished the weight of the pins, so that to produce the same number much less brass is consumed than formerly. The reduction in the price of pins, rated according to their weight, has been fully one half since 1835, while the quality has been improved in an equal ratio. The early operations in the United States were greatly embarrassed by the tariff then in force, by which pins were admitted duty free, while the brass wire suitable for their manufacture, and of which very little was made in the country, was subject to a duty of 20 per cent. For this reason the business languished until the tariff of 1842 secured to it sufficient protection, under which the manufacture became firmly established. At the present time the total weight of pins made in the United States is supposed to be from 7 to 10 tons a week. In quality they are quite equal to those of English manufacture.—Notwithstanding the apparent insignificance of pins, their use is so universal that the factories devoted to their production are very extensive, and large quantities of copper and zinc are consumed in the formation of the brass of which they are made; and though they appear so simple in their form and construction, some of the machines by which they are produced are exceedingly complex and expensive. The two factories in Connecticut have consumed of copper alone nearly a ton daily, making use of that of Lake Superior exclusively, and manufacturing their own brass and wire. The production of pins by both companies amounted in 1851 to about 8 tons a week. By the old methods of manufacture, which however varied considerably at different times, the distinct processes were usually stated to be 14 in number, commencing with straightening the wire, which had already been thoroughly cleaned, drawn down through a plate to the required size, and wound on a bobbin. The straightening was effected by drawing the wire quickly through the spaces between 6 or 7 upright pins fixed in a table in a slightly waving line, adapted to the thickness of the wire. The wire was thus run out in lengths of 30 feet, which were cut off, and these were reduced to shorter lengths adapted for 3 or 4 or 6 pins. Pointing was done by grinding the ends upon stones or steel cylinders, called mills, 30 or 40 of the pin wires being held together in the hands and made to rotate as their ends were applied to the grinding surfaces. They were then cut into the right lengths, and the bits not pointed were returned to the pointer. The pin heads, made of a finer wire, were prepared by winding them by a lathe into a spiral round other wires. Three turns of the spiral being cut off furnished the head for one pin. The heads were annealed by being brought to a red heat, and then shaped by the blow of a hammer. Each one being taken up on a pin wire, and this introduced point downward in a hole in the centre of a die, a blow from a drop hammer worked by a treadle secured the head to the pin. Another and still older method was to fasten two coils of the heading wire on the shank by hammering it between dies, acting transversely to the line of the shank. A rounded head was thus formed, neither smooth nor well fastened. The clumsy Dutch pins, still occasionally seen, present this form of head. Several finishing processes are still necessary for preparing the pins for market. They are cleaned by boiling them half an hour in sour beer, or solution of tartar. To whiten or tin them they are laid in a copper pan in alternating layers with grain tin, and when the vessel is nearly full water is added and heat applied; when hot, some cream of tartar is added, and the boiling is continued for an hour. The process may be repeated if required, the pins being washed in cold water between the boilings. Drying and polishing were effected by placing the pins together with bran in a leather sack, and causing this to be agitated for some time. This was formerly done by two men, who kept the sack moving from one to the other. After this the pins were separated from the bran by winnowing with fan blowers. Sticking the pins in papers, which are then folded up ready for sale, was a source of employment to great numbers of women and children about the pin factories. The papers were crimped for the rows of pins, and each one was set in a sort of vice, leaving the edges of two adjoining folds projecting. The paperer, catching up a number of pins between the teeth of a comb, introduced them one by one through the folds, placing each in one of the grooves channelled in the vice to serve as guides for sticking the pins. By the division of labor, each of these processes employing a special operator, the results were regarded as wonderful—about 12,000 pins being produced, many times handled, and put up for market, at a cost of about 3s. But the improvements introduced into the manufacture by American inventors have entirely changed its character, and led to the more rapid production of pins at much less cost of labor. One of the first objects aimed at in the new machines was to form the head from the pin itself, and thus lessen the extra work attending the construction and fitting of the separate heads, while producing a much neater and more durable pin. A general idea of the improved machines, which are altogether too complicated for a particular description, may be obtained from the accounts of them published in the 9th volume of "Newton's London Journal," and in Babbage's "Economy of Manufactures." The machines of Mr. Wright, while they were at the factory at Lambeth, are stated by Mr. Robert Hunt in his work, "Manufactures in Metal," to have attracted great interest in London, and to have been visited by strangers from the country as one of the curiosities of the metropolis. In practice, however, they did not prove successful, and their use was soon abandoned by Mr. Wright.—Among the most important improvements lately introduced in the manufacture are the machines for sticking the pins in papers. Until their introduction the pins when finished were taken by the families living in the neighborhood, and fixed in the papers by the women and children at their houses. This was an inconvenient and wasteful method, and not easily carried out upon a large scale. The first improvement over the old English "hand bee" was the invention of Mr. Samuel Slocum, and consisted in a hand machine patented in 1840, and used at Poughkeepsie. Various improvements were from time to time made upon this by different inventors, and for 16 years or more the machine was in operation at the factory at Waterbury and also at Birmingham, Conn. It is now superseded at both places by a recent improvement on a patent granted to Mr. Thaddeus Fowler of Connecticut. The pins are fed into a hollow cylinder which revolves on rollers, and are taken up in the compartments into which this cylinder is divided by means of longitudinal ribs extending along its inner surface. From these they drop upon an inclined plate, and sliding down this are caught in the links of an endless chain which passes along the lower edge of the plate. Each link is notched for as many pins as make a row, and each notch receives its pin hanging in it by the head. The whole row is then left together in the paper when the link is carried forward to the proper position. The only attention the machine requires is to supply it with paper and pins.—Pins have been recently made of iron and steel wire. To protect the metal from rusting, it is lubricated with oil as it passes the last time from the draw-plate. The manufacture is then conducted as with pins of brass wire. A factory is in operation in Connecticut producing them. Black pins for use with black dresses are prepared by japanning the common brass pins.

PIN WORM. See ENTOZOA, vol. vii. p. 229.

PINANG, an island in the strait of Malacca. See PENANG.

PINCHBECK, an alloy of copper and zinc, made to resemble some of the baser alloys of gold. It was brought into notice by Mr. Christopher Pinchbeck, musical clockmaker, who died in London in 1732. (See BRASS.)

PINCKNEY, the name of a family of South Carolina distinguished in the revolutionary and subsequent history of the United States. Thomas Pinckney, its founder, emigrated from Lincolnshire, England, to South Carolina in 1687, and established himself at Charleston, where the large brick mansion inhabited by him is still standing. He was a man of independent fortune, and by his wife, Mary Cotesworth, had 3 sons, Thomas, Charles, and William, of whom the first named, an ensign in the 17th regiment, royal Americans, died young. Charles, commonly known as Chief Justice Pinckney, was educated in England, subsequently practised law in South Carolina, and in 1752 was made chief justice of the province and king's councillor. His wife, Eliza Lucas, daughter of Col. Lucas of the British army, was the first to attempt the cultivation of rice in the Carolinas. Chief Justice Pinckney went to England in 1753 to superintend the education of his children, remaining there 5 years, and died in Carolina about 1758. His remaining brother, William, born in Charleston in 1708, died in Dec. 1766, was master in chancery and commissary-general of the province. Of the descendants of Charles and William the following were the most distinguished. I. CHARLES COTESWORTH, born in Charleston, Feb. 25, 1746, died there, Aug. 16, 1825. He was the eldest son of the chief justice, and at the age of 7 was taken by his father to England to be educated. Having passed through Westminster school, he was graduated at Christchurch college, Oxford, at an early age, after which he studied law in the Middle Temple. He subsequently passed nearly a year in the royal military academy in Caen, France, and in 1769 returned to Charleston and commenced practice as a barrister. Almost immediately he became a participator in the preparatory conflicts which opened the struggle of the revolution. He was a member of the first provincial congress of South Carolina, and in June, 1775, was elected a captain in one of the two regiments raised by the province. He served at the capture of Fort Johnson in Charleston harbor, and also participated in the movements resulting in the defeat of the British fleet before Fort Moultrie. The war languishing in the South after this, he joined the American forces at the North as a volunteer, and as aide-de-camp to Gen. Washington was present at Brandywine and Germantown. The South being again menaced, he returned in the spring of 1778 to Carolina, and participated in the unsuccessful expedition to Florida. In Jan. 1779, he presided over the senate of South Carolina; soon after aided Moultrie in protecting Charleston against a greatly superior force of British regulars under Gen. Provost; and in Oct. 1779, fought with great intrepidity in the disastrous assault upon Savannah, a vivid account of which from his pen was published in Gordon's history of the revolution. At the commencement of the siege of Charleston he held command of Fort Moultrie, which inflicted severe injury upon the British fleet approaching the city, although it could not retard its progress. The fort was soon after abandoned, and Col. Pinckney transferred his services to the besieged town, where he continued until its surrender, a measure which he opposed to the last. He remained a prisoner of war until the peace, when he resumed his practice at the bar. In 1788 he was a member of the convention which framed the constitution of the United States, and subsequently of that of South Carolina which ratified it; and again of that convention which in 1790 adopted the constitution of the state. After declining offers from Gen. Washington of a seat in the supreme court, and in his cabinet as secretary of war and of state, he accepted in 1796 the office of minister to France. Diplomatic intercourse between France and the United States was at that time beset with difficulties, and the directory, which was then in power in the former country, treated Pinckney with marked disrespect, and finally ordered him to leave the country. He returned subsequently with Marshall and Gerry as associates, but negotiations went on slowly, and the American commissioners were at length given to understand that nothing would be accomplished until the government had received a present in money. Talleyrand submitted this proposition to them, intimating at the same time that the penalty of refusal would be war. "War be it, then!" replied Pinckney. "Millions for defence, sir, but not a cent for tribute!" On returning to the United States he was appointed a major-general in the army, and in 1800 he was an unsuccessful candidate for president, receiving with John Adams the votes of the federal party. II. **Thomas**, brother of the preceding, born in Charleston, Oct. 23, 1750, died there, Nov. 2, 1828. Like his brother he was educated in England, first at Westminster school, and afterward at Oxford. He studied law in the Temple, was admitted a barrister, returned to South Carolina in 1770 after an absence of 19 years, and soon engaged in active resistance to Great Britain. In 1775 he was commissioned a lieutenant in one of the provincial regiments, in which he attained the rank of major, and upon the appointment of Gen. Lincoln as commander-in-chief of the southern army he became one of his aids. He fought with distinction at the battle of Stono; and at the assault upon Savannah, where he acted as aid to Count d'Estaing, he headed one of the assailing columns of the continental army, and succeeded in mounting the British redoubts, from which he was compelled to retire. After the fall of Charleston he joined the army of Gates, and at the disastrous battle of Camden was desperately wounded, and would have been slain had he not been recognized by a British officer, an old college friend, whose timely exclamation: "Save Tom Pinckney," stayed the bayonet uplifted against him. He was sent as a prisoner of war to Philadelphia, where he remained until the peace. In 1789 he was elected governor of South Carolina, and in 1792 received from Washington the appointment of minister to Great Britain, whence after a few years he was transferred in the same capacity to Spain, where he negotiated the treaty of Ildefonso, by which the United States secured the free navigation of the Mississippi. He returned home in 1796, and was soon after elected by the federalists to congress from the Charleston district. After serving for several years in this capacity he retired into private life, but in 1812 accepted the appointment of major-general of the southern military division of the country, the duties of which involved the prosecution of war with the Creek and Seminole Indians. His last active field service was at the battle of Horse-shoe Bend, where the military power of the Creeks was finally broken. Upon the conclusion of peace he retired definitively from public life. III. **Charles**, grandson of William, born in Charleston in 1758, died in 1824. He was educated for the bar, and when scarcely of age was chosen to the provincial legislature from the parish of Christchurch. At the capture of Charleston he became a prisoner, and remained such until near the close of the war, when he resumed his profession. In 1785 he was elected a delegate from South Carolina to the congress of the confederacy, and he subsequently took an important part in the preparation of a plan of government for the United States. In 1788 he advocated the ratification of the constitution in the South Carolina convention, and in the succeeding year he was elected governor of the state. In 1790 he presided over the state convention by which the present constitution of South Carolina was adopted; in 1791 and again in 1796 he filled the office of governor, and in 1798 was elected a senator in congress. He was a frequent and able speaker on the republican side of that body, and was one of the most active promoters of Jefferson's election to the presidency in 1800. During the same year he severely denounced the alien and sedition laws enacted under the administration of the elder Adams. In 1802 he was appointed minister to Spain, and during his residence in that country negotiated a release from the Spanish government of all right or title to the territory purchased by the United States from France under Mr. Jefferson's administration. In 1806 he was for the fourth time elected governor of South Carolina, and subsequently on several occasions he served in the state legislature. His last appearance in public life was in 1819-'21, when he represented the Charleston district of his state in congress, and earnestly opposed the Missouri compromise bill. IV. Henry Laurens, son of the preceding, born in Charleston, Sept. 24, 1794. He was graduated at the South Carolina college in 1812, subsequently commenced the study of the law with his brother-in-law Robert Y. Hayne, and was admitted to the bar. In 1816 he was elected to the state legislature from Charleston, and continued to be a member of that body for 16 years. In 1819 he became editor and proprietor of the "Charleston Mercury," which under his control was a prominent exponent of the doctrines of the "state rights" party, and about the same time definitively resigned his profession to embark in the career of politics. He was mayor of Charleston during the period of the nullification excitement, and in 1832 was elected to congress from the Charleston district; was reëlected in 1835, and in 1839 and 1840 was again mayor of Charleston. He was subsequently collector of Charleston and a member of the legislature. He has been a busy writer of political pamphlets of a strong southern tone, and is also the author of memoirs of Jonathan Maxcy and Robert Y. Hayne, the "Life and Public Services of Andrew Jackson," &c.

PINDAR (Gr. Πίνδαρος), a Greek lyric poet, born in Thebes or in the village of Cynoscephalæ, according to Clinton in 518 B. C., according to Böckh in 522, died according to the former estimate in 439, according to the latter in 442. Little is known of his history. He himself tells us that he was born during the celebration of the Pythian games, which was about the beginning of July. The family to which he belonged was one of the noblest of Thebes, being descended from the Ægids, who claimed to have sprung from the Cadmids. It seems also to have been renowned for its musical skill, and Pindar in his boyhood received lessons on the flute from the player Scopelinus. The taste which he early displayed for poetry led his father to send him to Athens for instruction in the art. There he remained until about the age of 20, having studied under Lasus of Hermione, and under Agathocles and Apollodorus. After his return to Thebes he received instructions from two poetesses, Myrtis and Corinna of Tanagra, the latter of whom seems to have exerted considerable influence over the young poet. Plutarch says that "she advised him to introduce mythical narratives into his poems, as the music, rhythm, and elevated language were properly designed simply to adorn the subject matter. In accordance with her recommendation, he wrote a hymn, still extant in part, which was filled with nearly all the Theban mythology; whereupon she said: 'We ought to sow with the hand, and not with the whole sack.'" Pindar very early began his career as a poet, as there is still extant an epinician ode written in his 20th year in honor of Hippocles, a victor in the Pythian games. He rapidly acquired great reputation, and the different states of Greece and the tyrants of the colonies on important occasions applied to him to write choral songs. Testimonials of respect and affection were also accorded him from all portions of the Hellenic world. He was honored with the complimentary franchise at Athens, Ægina, and Opus; by the inhabitants of Ceos he was employed to write a procession ode, although their own celebrated lyric poets Simonides and Bacchylides were still living; at Delphi an iron chair was furnished him to sit upon while he sang the Apollinean hymns; there also, by order of the Pythia, he was entitled to a portion of the banquet of the Theoxenia; and he was courted by numerous princes, in particular by Alexander of Macedon, and for the praises bestowed on his ancestor Alexander the Great is said to have spared Pindar's house when he destroyed Thebes. About 473 he accepted the invitation of the tyrant Hiero to visit Syracuse, where he remained about 4 years. He was a great admirer of Athens, which he frequently visited, and with whose inhabitants he was exceedingly popular. The poems of Pindar consisted of epinicia or triumphal odes, hymns to the gods, pæans, dithyrambs, odes for processions, songs of maidens, mimic dancing songs, drinking songs, dirges, and encomia or panegyrics on rulers. The only entire poems, however, that have come down to us are the *Epinicia*, which were all written in honor of victories gained in the public games, with the exception of the 11th Nemean, which was composed when Aristagoras was installed in the office of *prytanis* at Tenedos. The triumphal odes are divided into 4 books, corresponding to the 4 great public games of Greece, the Olympian, Pythian, Nemean, and Isthmian. The subject matter of the odes usually consists of the praise of the victor and of his city, with many allusions to the mythical origin of the former, and the legendary events connected with the early history of the latter. Either the wealth of the victor is praised, as in the case of triumphs won by the speed of horses, inasmuch as only the rich could afford to contend in the chariot races, or his valor is commended if he had undergone in the contest any personal peril. The mythical element is always a prominent feature in his odes. He was himself a strict worshipper of the gods, and appears to have placed credence in the marvellous and supernatural accounts of Greek legendary history. At the same time he rejects some of those stories and transforms others which do not agree with his conceptions of the gods. The quarrels between the divinities, and all stories representing the gods as guilty of wicked acts, he either formally repudiates or does not recount. As the epinician odes were sung by a chorus at a festival, many jocular remarks were admitted which would be inconsistent with the modern idea of the sustained sublimity essential to lyric poetry. Although the odes were sung by a chorus, the poet was supposed to speak in the first person, and Pindar availed himself of this circumstance to give advice to the victor, to defend himself against the attacks of enemies, and to assail rival poets. He sometimes indulges in praise of himself and depreciation of others, as in the second Olympian, where he compares himself in the following manner to Simonides and Bacchylides: "I have many swift arrows within my quiver; they have a voice for the wise, but for the common herd they need an interpreter. Wise is he who has learned much by his natural abilities; but those two, whose expertness comes from practice only, babbling in their garrulity like a brace of jackdaws, clamor in vain against the god-like bird of Jove."—The *editio princeps* of Pindar was printed at the Aldine press of Venice (8vo., 1513), along with Callimachus, Dionysius, and Lycophron. The best edition is that of August Böckh (2 vols. 4to., Leipsic, 1811-'21), containing a commentary and dissertations upon the music, metres, and lyric poetry of the Greeks, which threw much new light upon those subjects. There have been a few translations of Pindar into English verse, of which the last is by the Rev. H. F. Cary (London, 1833), which, although it follows the text of Heyne's edition, is superior to the older translations of West and Moore. In Bohn's "Classical Library" there is a prose translation by Dawson Turner, which is printed along with Moore's poetical version.

PINDEMONTE, IPPOLITO, an Italian poet, born in Verona in 1753, died there in Nov. 1828. He was educated at the college of Este and at Modena, travelled through France, Germany, Holland, and England, was made a knight of the order of St. John, resided for a time in Malta and Sicily, and finally established himself in Avesa near Verona. His chief works are: *Prose e poesie campestri* (1785); *Sermoni*, satires upon the follies of the times, somewhat in the style of Horace; *Arminio*, a tragedy founded on the death of Arminius, in which he introduced the chorus; *Fata Morgana*; *Elogia di Gessner*; *Il colpo di martello*; and *Elogie di letterati*, a biographical prose work (2 vols. 8vo., 1825-'6). He translated the Odyssey into Italian blank verse, beside translating from Virgil, Ovid, and Catullus.—His brother GIOVANNI, born in 1751, died in 1812, wrote some dramatic works, among them *I Baccanali*, and translated Ovid's *Remedia Amoris*.

PINDUS, in ancient geography, a range of mountains in northern Greece, a part of which, properly so called, separated the provinces of Thessaly and Epirus. The name is also used in modern geography. (See GREECE, and TURKEY.)

PINE (*pinus*, Tournefort), a genus of soft-wooded trees found in the temperate climates of the northern hemisphere. They belong to the large and important natural order of *coniferæ*, their fruit being an ament of conical shape, the scales of which become indurated and closely appressed. The conifers are trees or shrubs with a resinous juice, needle-shaped, entire leaves, and monœcious or diœcious flowers in aments, destitute of calyx or corolla. Their wood is made up of ligneous fibre peculiarly marked with small circular dots or disks, by which it can be readily distinguished. The true pines have been separated from the firs by modern botanists, being found to present distinctive marks. (See FIR.) In the pines the inflorescence is monœcious; the barren or staminate flowers are in terminal clustered spikes, the numerous stamens inserted on the axis by very short filaments and a scale-like connective; the anthers burst open lengthwise, shedding the pollen, each separate particle of which is made up of 3 united grains; the fertile aments are either solitary or clustered, and consist of imbricated carpellary scales, each in the axil of a deciduous bract bearing a pair of inverted ovules at the base; the fruit is a cone formed of ligneous scales, generally thickened at the apex, reflexed when ripe and dry, disclosing the 2 nut-like seeds lodged in shallow excavations at the base, each furnished with a thin membranous wing derived from the lining of the scale; cotyledons 3 to 12, linear. The leaves are in fascicles of 2 to 5, enclosed in a chaffy membranous sheath at their base, which in reality is a parcel of primary, withered bud scales. The number of the leaves thus enclosed in a common sheath furnishes a very convenient arrangement for the several species. —Of those in pairs may be cited the wood pine (*pinus sylvestris*, Linn.), a tree with an erect trunk and sometimes growing to a great size; its leaves short and glaucous, its cones stalked, ovate, and recurved, with rugged, truncate, and depressed scales; its timber furnishes the red deal, and in climates suitable to its growth it becomes a very picturesque object. On account of its hardiness it is sometimes planted to form a screen for tenderer sorts; the soil in which it grows and the climate seem to affect it so as to originate many distinct varieties, which are to be met with in different parts of Europe. The hooked pine (*P. uncinata*, De C.) is a fine alpine tree with an erect trunk; its leaves are short and dark green, its cones oval, recurved, sessile, with pyramidal and recurved truncated or mucronate scales; it is extremely hardy, and its timber is durable. The timber of the Pyrenean pine (*P. Pyrenaica*, La Peyrouse) is said to be of excellent quality and largely used in the Spanish marine; it is described as a majestic species, inhabiting the Sierra de Segura of Spain. A fine tree about the central parts of the Crimea, with erect trunk and horizontal branches when old, very long and stiff leaves, resinous and durable wood, but inclined to be knotty, is the Pallas pine (*P. Pallasiana*, Lambert); its resin is said to possess a very pleasant odor. The *pignons* of the French are the seeds of the stone pine (*P. pinea*, Linn.), a flat-headed species with an erect trunk, long, stiff, dark green leaves, round, polished cones, and large oblong seeds; its wood is often used in ship building, and its seeds eaten like nuts; a variety with thin-shelled seeds and whiter wood is also known. This species occurs in the Levant and south of Europe. The Corsican pine (*P. laricio*, Poiret) has a very erect, tall trunk, large, deep green, distant, rather loose leaves, and ovate horizontal cones, which are shorter than the leaves. Its timber is similar to red deal, but more brittle and less elastic; it is used extensively in ship building by the French; in the mountains of Corsica, Greece, Turkey, and Spain it becomes a fine tree. The cluster pine (*P. pinaster*, Aiton) has a lofty, erect trunk, long, stiff, dark green leaves, and clustered cones, the scales terminated by a rigid spine; it is a noble species on the sterile, sandy plains of France and S. Europe, especially near the coast. Its resin and tar are much consumed in making lampblack; loose drifting sands have also been arrested by artificially planting the tree. The yellow pine (*P. mitis*, Mx.) is a fine tree and common in dry soil from New Jersey to Wisconsin and southward; its trunk is 50 to 60 feet high and straight, and produces a fine-grained, resinous, lasting timber, especially valuable for flooring. The Table mountain pine (*P. pungens*, Mx.) is found upon the Blue ridge in Virginia and southward; it is a large tree with short, compact, pale green leaves, and has the general aspect of the European wood pine; its cones are borne in clusters, and remain hanging upon the tree for many years; its timber is much esteemed. The Jersey or scrub pine (*P. inops*, Aiton) is a straggling tree, 15 to 40 feet high, with spreading and drooping branchlets; it is used principally for fuel. The gray or northern scrub pine (*P. Banksiana*, Lambert) has a low, straggling, scrubby trunk; its rigid leaves are concave-grooved above; its wood is light and tough; it ranges from Maine to Wisconsin and northward. The red pine (*P. resinosa*, Aiton), improperly called the Norway pine, has an erect, lofty trunk, long lightish green leaves, ovate oblong, very obtuse cones, shorter than the leaves, red and rather smooth bark, and compact wood, which is much esteemed for strength and durability. The edible pine (*P. edulis*, Engelmann) is the *piñon* of the Mexicans and the "nut pine" of American travellers, a tree 40 to 50 feet high, with short, sub-globose, conic, sessile, erect cones, large, wingless, obovate seeds with shells thinner than those of the hazel nut, and very pleasant in flavor; it is a native of New Mexico. Another nut pine (*P. monophyllus*, Torrey) has one of its leaves suppressed, occasionally producing two from the same sheath; they are stout and rigid, somewhat sharp-pointed; the cones ovoid, scales with a thick, obtusely pyramidal, and protuberant summit, unarmed; seeds large without a wing; the kernel is of a very pleasant flavor, resembling that of the Siberian stone pine. This species was found by Fremont, extensively diffused over the mountains of northern California from long. 111° to 120°, and through a considerable range of latitude.—Of species whose leaves are in threes may be mentioned the Canary pine (*P. Canariensis*, C. Smith), growing upon the mountains of Teneriffe and the Canaries, where it forms large forests, and often acquires enormous size; its timber is very resinous and durable. The neoza pine (*P. Gerardiana*, Lambert) has a lofty trunk with a conical head; its seeds are large and edible; it grows in the highest forests of the Himalaya. The noble pine (*P. insignis*, Douglass) is a beautiful species, remarkable for its bright, dense green foliage; it is found in California. The southern pine (*P. australis*, Mx.) is a lofty tree with thin-scaled bark and very valuable resinous wood; leaves very long from long sheaths, crowded at the summit of the thick and very scaly branches; its uses are in ship building and for making tar; it constitutes almost the entire growth of the pine barrens in the southern states. Near to this is the long-leaved pine (*P. macrophylla*, Engelm.), with a trunk 70 to 80 feet high, leaves 13 to 15 inches long, in fours as well as in threes; some 4½ inches long; it is common on the higher mountains of Chihuahua in northern Mexico. A supposed form of this was noticed on the Zuni mountains, differing chiefly in the leaves being constantly in threes and shorter and in the smaller cones. The loblolly pine (*P. tæda*, Linn.) is a tree 50 to 100 feet high, with long, pale green, stout, straight leaves, and oblong cones; its bark is very thick and furrowed, its wood sparingly resinous; when found in old fields its trunk is low with spreading branches, and lands thrown out of cultivation are immediately covered with this species; it is found in Virginia and southward. The pitch pine (*P.*

rigida, Miller) has a thickish dark-colored bark; its wood is full of knots and saturated with resin; it is very common in a low stunted form on sandy plains and spare rocky soil from Maine to New York and southward, and is employed for fuel. Sabine's pine (*P. Sabiniana*, Douglass) is a noble Californian species, with a trunk 140 feet high, and is remarkable for its large heavy cones, the scales of which are produced into long recurved points; its nut is large and edible. This tree, occurring on the western slopes of the Sierra Nevada, is one of the many called white pine in California; its foliage is thin and of a very light green, giving it a very peculiar aspect, different from all the other pines of that country; its wood is tough and elastic. A still more singular-shaped cone is the fruit of the great hooked pine (*P. Coulteri*, Don), a large strong-growing tree with brownish bark, large branches, and spreading top; leaves 9 inches long, incurved, somewhat compressed, mucronate, 2-furrowed above, flattish beneath, slightly serrated on the margin and on the elevated line along the middle; cones large, conical-oblong, 1 foot and more in length, 6 inches in diameter near the middle, and weighing about 4 lbs. each; scales wedge-shaped, elongated at the apex, lanceolate, mucronate, compressed on both sides, incurved and hooked, very thick and indurated; the species occurs on the mountains of California, at an elevation of 4,000 feet above the sea. Engelmann's pine (*P. Engelmanni*, Torrey) is a large and fine tree, often 80 to 100 feet high and 2 or 3 feet in diameter; leaves 4 to 6 inches long, the sheaths mostly black; the cones about 4 inches in length, erect, ovate or elongate, conical, scales recurved and prickly, seeds obovate; it is common on the mountains of New Mexico. The bony-seeded pine (*P. osteosperma*, Engelm.) is a small tree 10 to 20 feet high; cones sessile, erect, sub-globose, smooth; seeds large, wingless, obovate, with a hard shell; it occurs on the mountain borders near Buena Vista and about Santillo in New Mexico.—Of the species whose leaves are in fives may be mentioned the Montezuma pine (*P. Montezumæ*, Lambert), a tall tree growing on the mountains of Mexico at an elevation of 11,000 feet above the sea level; the thread-leaved pine (*P. filifolia*), a noble species brought to notice by Mr. Hartweg, who found it in Guatemala, with leaves acutely triangular and from 12 to 15 inches long; the Cembran pine (*P. Cembra*, Linn.), an erect conical tree, with stiff glaucous green foliage, and oblong cones containing large, very hard-shelled seeds, the kernel white, oily, and agreeable to the taste; the last is an ornamental and hardy species, with fragrant, fine-grained, soft wood, a native of Siberia, Tartary, Switzerland, and Italy. The Bhotan pine (*P. excelsa*, Wallich), a native of Nepaul on the mountains, is a tall, handsome, pyramidal tree, from 90 to 120 feet high; its wood is white and abounds in liquid resin; in habit it is similar to the following. The North American white pine (*P. strobus*, Linn.) often grows from 120 to 160 feet high in a single, erect, columnar trunk when occurring in primitive forests; its leaves are of a rich deep green, its cones elongated, somewhat curved, the scales thin and soft, the seeds small; it is a most valuable tree, and furnishes in the New England states an immense amount of lumber in boards and shingles; its geographical range is from the Saskatchewan, lat. 54° N., to Georgia, and from Nova Scotia to the Rocky mountains. A very similar species is the *P. strobiformis* (Engelmann), the largest pine in New Mexico, growing upon the highest mountains; its trunk rises to 100 or 130 feet; the cones are 10 inches long and very resinous. Still another is the Rocky mountain white pine (*P. flexilis*, James), whose trunk varies from 50 to 100 feet in height; it is in some respects like the Cembran pine, its seeds being eatable. The sugar pine (*P. Lambertiana*, Douglass), so called from the sweetness of its resinous juice, which plentifully exudes from the tree, is described by Mr. Douglass as of great size, its trunk attaining a height of 200 feet and a circumference of about 60 feet; its branches are pendulous and form an open pyramidal head; the leaves 4 to 5 inches long, with short deciduous sheaths; the cones pendulous from the extremities of the branches, and when ripe about 16 inches in length; the seeds large, oval, and winged, the ala of a fuliginous color, and containing an innumerable quantity of minute sinuous vessels filled with a crimson substance, and forming an interesting microscopical object; the kernel is sweet and pleasant to the taste, and the seeds therefore form an important item of food to the Indians who collect them. This species was found growing upon the most sterile sandy plains to the westward of the Rocky mountains in California, not forming dense forests, but scattered singly over the undulating country.—The pines are generally of rapid growth and easy of cultivation, being raised from seeds, which should be sown when fresh. Many are remarkable for their beauty and especially adapted to artificial planting. The white pine and the pitch pine can be advantageously transplanted when young to cover worn-out and sand-covered fields, taking up the trees when they have made the young shoots of the summer's growth, which should be about an inch long. Other species doubtless bear removal as well. The rarer or more valuable kinds are grafted upon the hardier and more common by the process practised among the French, callled herbaceous grafting or *greffe Tschudy*, having been invented by a nobleman of that name; this is done when the young shoots are so tender as to easily break, and the scion is inserted by the cleft process. Sometimes the stock of rarer kinds is increased from layers by skilful gardeners. The *conifers* are readily raised from cuttings; they strike root best when the cuttings are from the present season's growth, taken off near where it proceeds from the old wood and when nearly ripe, some time in August. With a slight bottom heat it is said they will root in 3 weeks; but when no heat can be applied, they will be rooted by spring, and after they have made one year's growth they should be set to the ground. Cuttings should be protected from frost.—For economical uses no tree in the temperate regions is to be compared with the pine. Several branches of industry are dependent entirely upon its products, and all the commercial articles known as naval stores, which support a large department of trade, are nothing else than a portion of these products. The business of cutting, bringing to the mills, and sawing into lumber the pines of the forests of Maine has together with the trade in this article given employment to a considerable portion of the inhabitants of that state. More than 10,000 men have year after year been engaged upon the Penobscot river alone in logging and sawing. Before the rivers freeze up in the autumn they repair in companies of 15 to 20 by bateaux to the pine districts in the distant wilderness about the sources of the rivers, and even upon the lakes and streams whose waters flow northward, but which by artificial channels have been connected with the southern rivers of Maine. They drive up the banks of the rivers and through the thick woods and almost impenetrable swamps the oxen upon whose labors they depend for hauling the logs down to the streams during the winter, and for whose support they have made provision by cutting and stacking in the summer the wild grass in the vicinity of the spots selected for their operations. Arrived at these places remote from all settlements, they prepare their camp for the long winter, constructing a rude shanty of logs with a single sleeping place upon the ground extending its whole length, and filled in with the flat branches of the hemlock, balsam fir, and white cedar, upon which they spread their blankets. A warm stable is built for their cattle, and a storehouse for their supplies of selected clear pork, flour, molasses, green tea, and rum. Their operations are soon commenced by felling the large pine trees that are found scattered here and there through the forests, and when the snow crust is in the best condition for working the oxen the logs are hauled down upon the ice that covers the streams. The work is thus continued through the winter, and when the ice begins to move in the spring the lumbermen break up their camp and engage in the arduous and very dangerous task of driving or running the logs down the streams. During the spring freshets they are at times swept rapidly down, logs, ice, and bateau hurried with the foaming torrent through the rocky sudden descents and down the long rapids, or they are thrown upon the ledges, grounded upon the banks, or entangled with great accumulations of fallen trees, which with the cakes of ice form "jams" that entirely obstruct the passage. These are laboriously removed by cutting away the obstructions from below upward, the men often being precipitated into the icy waters, and not unfrequently carried down and swept away by the rush of the fragments as they are set free. Thus many lives are annually lost upon these rivers. A portion of the men in a bateau keep behind all the logs, setting those adrift that are caught on the banks, and pushing them onward when the current is slack. This also is a work of no little difficulty, especially in passing through the lakes, some of which are many miles in length, and in which the logs are liable to be driven back and dispersed by the winds, and the bateau to be swamped by the waves. In such service is nurtured a class of the most hardy and daring men, admirably fitted by their pursuits for pioneers of an army, as was proved by the corps of them specially detailed for this service in the Mexican campaign. Other pine districts of importance for the large amounts of this timber they have produced are about the head waters of the Hudson river, of the Susquehanna and Delaware, and especially at the sources of the Alleghany river in New York and N. Pennsylvania, whence large supplies have been sent down the Ohio. The N. portion of the lower peninsula of Michigan as well as the upper peninsula also abound with pine, and the pine forests of N. Wisconsin are of vast extent and importance. At the mills the logs are converted into square timber, or cut up into boards, plank, clapboards, and shingles. The machinery for these purposes, some of which is noticed in the article CLAPBOARDS, is exceedingly ingenious and efficient. Pines also afford the masts for ships and the still longer ones for sloops. The southern pines (*P. mitis* and *P. australis*) are much harder to work than the white and red or Norway pines of the north; but, as already stated, they make excellent flooring boards for houses and the decks of ships and good timber for ship building. Near the coast of the Carolinas flat sandy tracts covered almost exclusively with the *P. australis* extend many miles into the interior, and are the chief sources of the supplies of tar, pitch, rosin, and turpentine of northern commerce. The methods of obtaining these articles from the pine tree are particularly described in this cyclopædia under their own titles.

PINE MARTEN. See MARTEN.

PINEAPPLE, the esculent fruit of the *ananassa sativa* (Lindley) from tropical America, and belonging to the natural order *bromeliaceæ*, which is composed of endogens with 6-leaved flowers having imbricated divisions and mealy albumen. The habits of the several species in this order are peculiar; they are hard dry-leaved plants, often with a scurfy surface, and capable of enduring great heat and continued dryness, yet producing blossoms distinguished for beauty and fragrance. The characters of the order are: calyx 3-parted, sometimes colored; petals 3, colored, withering or deciduous; stamens 6, inserted in the tube of the corolla and calyx; ovary 3-celled, many-seeded; seeds always numerous, with a leathery skin or tapering into a slender thread. The pineapple may be considered the most remarkable of all the species. It is an indigenous plant in the woods of South America, and from thence has been carried to Africa and to the East Indies, where it now forms a part of the naturalized flora. The pineapple fruit, structurally regarded, is no more than a cluster of flowers arranged upon an elongated axis of inflorescence, and terminating in a tuft of green leaves; each flower and its accompanying bract become thickened and fleshy, and as there are many on the spike, this increase causes a crowding together and swelling out of the whole until a massive head of individual flowers changed into a sort of berries is the result; the withered tips of the petals remain and give to the rhomboidal-shaped divisions of the fruit the appearance of an eye, technically called by gardeners the pip. In the wild condition each of these contains seeds; but long cultivation and stimulating soils have obliterated the disposition to bear seeds, a condition to which other vegetables or fruits are frequently reduced, as in the seedless varieties of the grape, orange, &c. By these means the crown of leaves and the suckers at the base of the fruit are required to propagate new plants, and new varieties must be expected from plants growing wild or in such a condition as to allow the perfection of the ovules instead of the carpel-like and pulpy envelopes. The pineapple has been extensively the subject of the gardener's care, especially in Great Britain, and many contrivances have been invented to raise it in perfection. The chief considerations seem to be a good, rich, loamy soil, warmth applied to the roots, abundance of water and moisture in a high temperature, supply of liquid stimulants when in a growing state, and less water and more air when the fruit is ripening. It is said that fruits thus raised in glass structures called pineries are far superior in point of flavor to any which grow in the open air, although the wild sorts found in parts of the East Indies are highly praised. In the Azores, the pineapple is raised in pots, which are set in the open air in summer, and protected in winter from the cold by merely a structure with a glazed roof known to gardeners as a lean-to. The varieties in the London horticultural society's catalogue are more than 50 in number, but those particularly recommended are the queen, Antigua, queen, black Jamaica, and Moscow; and the largest fruited are the Enville and Trinidad.—The juice of the unripe fruit of the pineapple is excessively acid and excoriating to the mouth. It is sometimes employed along with allied species, the *bromelia pinguin*, and others, to destroy intestinal worms and to promote the secretion of urine; and from the fibres of the leaves of the *ananassa* very fine cloth is manufactured.—The representative of the *bromeliaceæ* in the United States is the Spanish moss (*Tillandsia usneoides*, Linn.) of the south, and several other species known as air plants occurring in southern Florida.

PINEL, Philippe, a French physician, born at St. Paul, near Lavaur, department of Tarn April 20, 1745, died in Paris, Oct. 25, 1826. He was the son of a physician, and studied in several colleges, supporting himself meanwhile by private teaching. In 1778 he removed to Paris, where he gave lessons in mathematics, devoted every leisure moment to medical investigation, and wrote for the medical and the philosophical journals. His proposal for a new classification of animals, based on the formation of the jaw bone, gave him so much reputation as to make him a competitor with Cuvier for a professorship at the *jardin des plantes*. In 1785 he was led to turn his attention to insanity, and, taking charge of a private asylum for the insane, he tried with success, for 6 years, the substitution of gentle measures for the harshness then almost universally practised. In 1791 he obtained a prize from the society of medicine for the best essay on the treatment of insanity, and soon afterward was appointed physician of the Bicêtre. This immense establishment was a prison, almshouse, hospital, lunatic asylum, and nursery, all in one; and the different classes of inmates were suffered to mingle with one another. It was crowded almost beyond endurance, while many of the buildings were utterly unfit to be inhabited. The insane were chained in dark, damp, and filthy cells, and their keepers were malefactors condemned to this duty as a punishment for their crimes. It was very rare that a lunatic recovered. Under Pinel's administration each class was confined to its own quarters, the worst portions of the buildings were torn down, and the remainder thoroughly repaired and cleansed. The improvement in the condition of the insane was, however, the object at which he especially aimed; and this he was compelled to attempt in person, for cruelty had rendered the unhappy creatures so ferocious that no one durst set them at liberty. The number of cures he accomplished, even among these chronic cases, astonished the profession; and the method of treatment he introduced has been adopted in all civilized countries. After two years he was transferred to the Salpêtrière, a similar institution for females. His works on diseases of the mind gave the first decided impulse to that investigation of insanity which has conferred so much honor upon the medical science of the present day. At the death of Cuvier he succeeded him as a member of the academy of sciences. He was the author of 24 medical treatises, 6 of which were on insanity and cognate topics, and 13 or 14 on the mechanism of the joints, and other subjects connected with animal mechanics.

PINEROLO, or Pignerol, a city of Italy, in the province of Turin, on the Clusone, 20 m. S. by W. from Turin; pop. in 1860, 15,494. It has 6 churches, 9 convents, and manufactories of silk, wool, cotton, &c. It came into the possession of the house of Savoy in 1042, but was several times conquered by the French, who held it from 1536 to 1574, from 1632 to 1696, and from 1801 to 1814. The conquerors during the 17th century considerably strengthened its fortifications, but dismantled them on being obliged to give it up.

PINES, Isle of. I. (Sp. *Isla de Pinos.*) An island near the S. W. extremity of Cuba, 65 m. in extreme length, and 45 m. in breadth; area, 1,200 sq. m.; pop. in 1864, 1,400. Nueva Gerona, the capital, is situated on the N. side, and the other places of most importance are Santa Fé and Jorobado. It is separated from Cuba by a channel about 35 m. wide, and the coasts are indented by numerous bays, many of which afford good anchorage. There are several mountains, the most remarkable of which are the Sierra de la Cañada, the Daguilla, and the Sierra de los Caballos, respectively 1,600, 1,500, and 1,074 feet above the sea. Extensive tracts of marsh extend across the centre of the island in an E. and W. direction; the soil in other places is exceedingly fertile. It is well watered, and some of the rivers are navigable for vessels drawing 10 feet 4 or 5 m. from the sea. The climate is mild and healthy. There are mines of iron, silver, and quicksilver, and sulphur, rock crystals, and marble are found, the last of many colors and excellent quality. Tobacco and different kinds of fruit are grown, and timber is abundant, the most valuable descriptions being pine, mahogany, and cedar. The island is a dependency of Cuba. Columbus discovered it in 1494; and it was afterward much frequented by pirates. II. An island of the Pacific ocean, about 42 m. in circumference, situated near the S. E. extremity of New Caledonia; lat. of the peak on the S. E. part 22° 38' S., long. 167° 25' E.; pop. estimated at 2,500. Many kinds of fine timber grow on the island, among others a pine similar to that of Norfolk island, and sandal wood. The natives are middle-sized, of a dark color, and of the Papuan race, like the Feejee islanders, whom they much resemble. The males are circumcised, and both sexes go nearly naked. They are cannibals, and are exceedingly cruel and ferocious.

PINGRÉ, Alexandre Gui, a French astronomer, born in Paris, Sept. 4, 1711, died in 1796. He received his education at a convent school in Senlis, and early became a teacher of theology; but having embraced Jansenistic opinions, he was compelled to abandon this career, and devoted himself to astronomy. He published, from 1754 to 1757, under the name of *État du ciel,* a valuable nautical calendar; and after verifying La Caille's table of modern eclipses in the *Art de vérifier les dates,* he computed the similar phenomena that had occurred in the 10 centuries preceding our era. From 1760 to 1776 he made scientific voyages to observe transits of stars, and to ascertain the value of Berthoud and Leroy's timepieces. In 1783 he published his *Cométographie, ou traité historique des comètes* (2 vols. 4to.), upon which he had been engaged for several years. He calculated the orbits of 24 comets. In 1786 appeared his translation of Manilius's *Astronomica.*

PINK, the common name of varieties of the *dianthus caryophyllus* (Linn.), which in its natural condition grows wild in the south of France and in England, where it is met with on old ruinous walls. The pink is of the natural order of *caryophyllaceæ,* which are herbaceous plants with swollen articulate stems; opposite, entire leaves; regular flowers; sepals 4 or 5, and petals the same; stamens 5 or twice as many; styles 2 to 5; fruit a capsule; seeds curved, with a mealy albumen. They are natives chiefly of the frigid and temperate parts of the world. The 4 principal varieties of the pink are the double-flowered, called the carnation; the fruticose or tree carnation; the imbricated or clove, of a dark sanguineous color, with the stigmas protruding beyond the petals, and of delicious fragrance; and the thistle-like (*carduinus,* Don), with leaves, calyx, and petals beset with fistulous spines. The carnations are themselves divided into 3 classes, viz.: flakes, in which there should be 2 colors, the stripes of the blossoms going quite through the petals; bizarres, the flowers variegated in irregular stripes and spots, and having 3 distinct colors; and picotees, the flowers having a white ground spotted with scarlet, red, purple, or other colors; the last named are hardier than the others, with smaller blossoms and their margins serrated. The original type of the common garden pink is the *dianthus plumarius* (Linn.), with a stem bearing 2 or 3 flowers, the teeth of the calyx obtuse, calycine scales somewhat ovate, very short, mucronulate, close pressed; petals jagged, multifid, bearded; leaves linear with scabrous margins. It is supposed to be a European plant, but from what country is uncertain. Its flowers are more or less fringed, sweet-scented, double, single, white, purple, spotted, and variegated. Two principal varieties are known, viz.: *hortensis* (De C.) with petals bearded in the throat; and *pratensis* (De C.), with smaller leaves and petals scarcely fringed. The garden pink has been greatly improved by the florists within a century past, having been before treated as a border plant. Some beautiful sub-varieties known as Paisley pinks are hybrids originating in that part of Scotland among the weavers and artisans; and the sorts most esteemed by them are what are called pheasant eyes, from a dark spot in the centre of the blossom, and the nearer this approaches to black the more it is valued. Between 200 and 300 sorts are enumerated. An intermediate form between pinks and picotee carnations is called the cob pink, which is of large size and much prized. The carnation and pink delight in a rich loamy soil inclining to sandy, and require but little protection, wintering well in cold frames. They are propagated by cuttings, layers, and seed. The superb pink (*D. superbus,* Linn.) has green, smooth, linear-lanceolate leaves, sweet-scented flowers borne on branching stems in twos or threes, the petals rose purple or lilac; it grows spontaneously on heaths and borders of forests in mountainous countries of Europe. A variety with purple flowers is known. Several others of the dianthus tribe are called pinks, but their scentless flowers and rather different mode of inflorescence cause them to be treated with less consideration. Some new and very curious varieties of the *dianthus Chinensis* have lately come into notice, known as Japan pinks, of which *D. Hedwigii*, *laciniosus*, and *monstrosus* are examples; the style of the plants, their glaucous foliage, and stiff, upright, patulous blossoms, do not recommend them.

PINKERTON, John, a Scottish author, born in Edinburgh, Feb. 17, 1758, died in Paris, March 10, 1825. He was intended for the legal profession, but having established himself in London in 1780, he entered upon a literary career of singular activity. After publishing some trifles in verse under the title of "Rimes" (8vo., 1781), he edited "Select Scottish Ballads," many of the pieces in which he subsequently confessed were his own composition, succeeded by more volumes of verse, an "Essay on Medals" (2 vols. 8vo., 1784), once a useful manual for numismatists, and "Letters on Literature, by Robert Heron" (8vo., 1785). The last named work, exemplifying a new system of English orthography, procured him the acquaintance of Horace Walpole and Gibbon. He next edited "Ancient Scottish Poems" (2 vols. 8vo., 1786), published from the MS. collections of Sir Richard Maitland, and long supposed to be forgeries, although their genuineness is now authenticated. In 1787 appeared his "Dissertation on the Origin and Progress of the Scythians or Goths," which, with the "Inquiry into the History of Scotland preceding the Reign of Malcolm III." (2 vols. 8vo., 1789), is chiefly remarkable for the strong anti-Celtic feeling of the author, who undertakes to prove that the Celts were an inferior race to the Goths, "being mere savages, but one degree above brutes." His "History of Scotland from the Accession of the House of Stuart to that of Mary" (2 vols. 4to., 1797) is less colored by prejudice, and is still considered the most accurate history of the period. After the death of Walpole he collected and published notes of the conversation of his patron, with a memoir, in 2 vols. 12mo., under the title of "Walpoliana." Among his remaining works were the "Medallic History of England to the Revolution" (4to., 1790); "Iconographia Scotica" (2 vols. 8vo., 1799); "Modern Geography digested on a New Plan" (2 vols. 4to., 1802); "General Collection of Voyages and Travels" (17 vols. 4to., 1808–'13), accompanied by a "New Modern Atlas," published in parts (1809–'15); and "Petralogy, or a Treatise on Rocks" (2 vols. 8vo., 1811). In addition to these he edited 3 volumes of scarce Scottish poems, Barbour's "Bruce," "Lives of Scottish Saints," &c. The last 22 years of his life were passed in Paris, where, notwithstanding his ceaseless industry, he died in indigent circumstances. He was a man of vigorous intellect and very considerable historical and antiquarian learning, but full of prejudices. He is described as "a very little and very thin old man, with a very small, sharp, yellow face, thickly pitted by the small pox, and decked with a pair of green spectacles." His literary correspondence was edited by Dawson Turner (London, 18[illegible]).

PINKNEY, William, an American lawyer, born in Annapolis, Md., March 12, 1764, died Feb. 22, 1822. His family was a branch of the South Carolina Pinckneys, and early settled at Annapolis. He studied medicine in Baltimore, but in 1783 resolved to devote himself to law, and was called to the bar in 1786. His very first efforts gave him a marked position. In 1788 he was elected a delegate to the convention which ratified the constitution of the United States, and subsequently held various state offices in the house of delegates, senate, and council. In 1796 he was sent to London by President Washington as commissioner under the Jay treaty, remaining abroad until 1804, when he became attorney-general for the state of Maryland. He was sent minister to England in 1806, and held that office till 1811, when he was appointed attorney-general of the United States by Mr. Madison. He held this office over two years, and resigned it in consequence of an act of congress requiring the attorney-general to reside at Washington. He commanded a volunteer corps in the war of 1812, and was severely wounded at the battle of Bladensburg. In 1815 he was a member of congress, and in 1816 was appointed minister to Russia and special minister to Naples, returning home in 1818. The following year he was elected a member of the U. S. senate, where he made two elaborate speeches on the Missouri question, and was a member of the committee of conference that reported the Missouri compromise, which he strongly advocated. At the time of his death Mr. Pinkney was by general acknowledgment at the head of the American bar, occupying very nearly the same position that was held by Daniel Webster some years later. His "Life" was written by Henry Wheaton (New York, 1826).—**Edward Coate**, son of the preceding, an American poet, born in London, during the temporary residence there of his father as American commissioner, in Oct. 1802, died in Baltimore, April 11, 1828. He was educated at St. Mary's college, Baltimore, and at the age of 14 entered the navy as a midshipman. In 1824 he resigned his commission, was married, and commenced the practice of the law. Failing in this, he attempted unsuccessfully to procure a commission in the naval service of Mexico; and in 1827 he assumed the control of a political journal called "The Marylander," which from ill health he was soon obliged to relinquish. His poetical reputation rests on a volume entitled "Rodolph and other Poems," published anonymously in 1825. Some of the songs in this, including the "Health" and the "Picture Song," still have great popularity.

PINT, a measure of capacity, being the 8th part of a gallon. (See Gallon.)

PINTADO. See Guinea Fowl.

PINTELLI, Baccio, an Italian architect, born probably in Florence about the middle of the 15th century, died probably in Urbino about the commencement of the 16th century. He was the principal architect of Pope Sixtus IV., for whom he erected about 1473–'5 the Sistine chapel. He also designed the church and convent of Santa Maria del Popolo, the old library of the Vatican, the churches of San Pietro in Vincoli, Santa Maria della Pace, and Sant' Agostino, the Ponte Sisto over the Tiber, &c. After the death of Sixtus he went to Urbino, and was engaged upon the ducal palace of that city.

PINTO, Mendes. See Mendez-Pinto.

PINTO DE FONSECA. See Chaves, Marquis of.

PINTURICCHIO, Bernardino, an Italian painter, born in Perugia in 1454, died in 1513. He was a pupil of Perugino, and one of the best painters of the Roman or Umbrian school previous to the time of Raphael, excelling in portraits, history, and architectural accessories. He executed portraits of Popes Pius II. and Innocent VIII., Isabella the Catholic, and other eminent personages, but is chiefly distinguished by his history of Pius II., painted in 10 compartments of the Duomo of Sienna, and in which he was assisted by Raphael.

PINY WOODS, a term applied to several very different regions of country in the southern states of North America, but more particularly to that broad belt of territory extending from 60 to 100 m. inland from the N. shore of the gulf of Mexico, and including nearly the whole of West Florida, with the southern parts of Alabama and Mississippi, and the S. E. corner of Louisiana. Portions of East Florida, Georgia, and the Carolinas partake, in a greater or less degree, of the same general features. This region is but little cleared and cultivated. Its characteristics are entirely different from those of the adjacent cotton districts. The soil is sandy and barren, and the predominant and to a great extent almost unvaried growth is pine, both in the hill and level portions, for there is a great diversity of surface. The absence of undergrowth allows the eye a wide range of vision, and gives to these forests a singularly stately appearance. The borders of the streams and swamps are fringed with a thick growth of magnolia, bay, laurel, and other evergreens. "Bay-gall" is the provincial term commonly applied to the smaller of these swamps or thickets—often the source of streams—which constitute a familiar feature of the country. It is here that the deer and other game, which are rare in the open woods, find a refuge. Open glades, or savannas, of greater or less extent, are frequently met with. A curious phenomenon occasionally occurring in these woods consists of a circle of trees, of an acre or less in extent, entirely dead, without any apparent cause. This is variously attributed to the effects of lightning or the ravages of insects. The brooks and rivulets of the piny woods consist of the purest and most limpid water. The atmosphere is singularly healthful and exhilarating, and the exhalations from the pine are believed to possess properties positively curative of incipient pulmonary disease. The population is small and scattered, on account of the unproductiveness of the soil. Of late years, however, there have been large accessions to the amount of labor and capital employed in obtaining timber and turpentine, as well as, to a limited extent, in the cultivation of the land.

PINZON, the name of a family of wealthy and daring navigators in the port of Palos de Moguer in Andalusia, 3 members of which were intimately associated with Columbus in his discovery of America. I. Martin Alonso, the head of the family at that time, was so convinced of the feasibility of the project, that he offered to afford the means for Columbus to renew his application to the court. When the latter had obtained the royal order to fit out 3 vessels for the voyage, it was principally through the influence of the Pinzons that crews could be collected for them. Martin Alonso commanded the Pinta on this voyage. In the subsequent cruising in search of the imaginary island of Babeque, he deserted Columbus in the latter part of Nov. 1492, and went in search of it himself. He stopped at a river in Hispaniola, now called Porto Caballo, but which for a long time was designated as the river of Martin Alonso. From here he carried off 4 men and 2 girls with the intention of selling them in Spain as slaves, but was afterward forced to give them up by Columbus, with whom he fell in during the following January, attributing his parting company with the admiral to stress of weather. On the return voyage they were again separated by a storm, and Pinzon was driven into the port of Bayonne. Not doubting that Columbus had perished in the tempest, he wrote to the sovereigns, giving information of the discovery, and asking permission to come to court and deliver his account in person. He arrived in Palos the evening of the same day with the admiral, and found that the latter had had a triumphant reception. He landed in private, and, broken in health and spirits, received not long after a letter from his sovereign forbidding him to appear at court. This added to his dejection, and soon after he died. II. Vicente Yañez, who had commanded the Niña in the first expedition of Columbus, in consequence of the general license given by the Spanish sovereigns to make voyages of discovery, fitted out an armament of 4 caravels, manned principally by his friends and relations, and in Dec. 1499 sailed from Palos in a S. W. direction. After having gone about 700 leagues, he crossed the equinoctial line and lost sight of the north star. On Jan. 26, 1500, land was descried; it was Cape St. Augustine. Pinzon was thus the first European to cross the equator in the western ocean, and the first discoverer of Brazil. Landing, he took formal possession of the country for the Castilian crown; but being resolutely met by warlike natives, he sailed to the N. W., and after various adventures reached the mouth of the Amazon. Pursuing his course, he passed the mouth of the Orinoco, and in the latter part of June reached Hispaniola. In the following month two of the caravels were sunk with their crews in a terrific hurricane. Pinzon arrived in Palos about the end of September, after a disastrous voyage, which had swallowed up all his fortune. On Sept. 5, 1501, royal permission was given him to colonize and govern all the country he had discovered from Cape St. Augustine to a little north of the Amazon, but he never made a second expedition into those parts. In 1506 and again in 1508 he was concerned in voyages to discover the passage which Columbus supposed to lead from the Atlantic to a southern ocean. III. **Francisco Martin**, the third brother, accompanied the first expedition of Columbus, as pilot of Martin Alonso's vessel, the Pinta.—By the emperor Charles V. the Pinzon family were raised to the rank of hidalgos, in reward for the services in discovery its members had rendered. It still exists in Moguer near Palos.

PIOMBO, Fra Sebastiano del, an Italian painter, whose family name was Luciano, born in Venice in 1485, died in Rome in 1547. He studied under Giovanni Bellini and Giorgione, and by his works attracted the attention of Agostino Chigi, a merchant of Sienna, who persuaded him to visit Rome. Here Michel Angelo gave him valuable advice, and it is even reported by Vasari that he aided him in the composition of some of his most celebrated works, and set him up as a competitor to Raphael. Sebastiano's "Raising of Lazarus," which is said to include several groups and figures invented, if not designed, by the great Florentine, was at all events intended to rival the "Transfiguration" of Raphael. He excelled most however in portraiture. Clement VII. appointed him keeper of the papal seals, from which circumstance he derived his surname of Piombo (lead), the substance used in sealing bulls. His office obliged him to assume the monk's habit, whence he was styled Frate or Fra.

PIOZZI, Hester Lynch, an English authoress, born in Bodvel, Caernarvonshire, in 1739, died in Clifton, near Bristol, May 2, 1821. She was the daughter of John Salusbury, esq., and in 1764 married a wealthy brewer named Thrale. Shortly afterward she formed an acquaintance with Dr. Johnson, to which fact she owes all the celebrity she has in literature. With him she preserved a close intimacy until, much against his wishes, she married in 1784, after the death of Thrale, an Italian music master named Gabriel Piozzi. After Johnson's death she published a volume entitled "Anecdotes of Dr. Samuel Johnson during the last Twenty Years of his Life" (8vo., 1786). This publication produced a feud between her and Boswell and the other friends of Johnson, which gave rise to Dr. Wolcott's poem of "Bozzy and Piozzi." While living in Florence in 1786, she printed with Merry, Greathead, and Parsons, the founders of the Della Crusca school of poetry, a collection in prose and verse called "The Florentine Miscellany," which however was not published. Her other works are: "Letters to and from Dr. Samuel Johnson" (2 vols. 8vo., 1788); "Observations and Reflections made in the course of a Journey through France, Italy, and Germany" (2 vols. 8vo., 1789); "British Synonymy, or an Attempt at regulating the Choice of Words in Familiar Conversation" (2 vols. 8vo., 1794); and "Retrospection, or a Review of the most striking and important Events, Characters, Situations, and their Consequences, which the last Eighteen Hundred Years have presented to the view of Mankind" (2 vols. 4to., 1801). She is also said to have written much both in prose and verse for various publications; but the poems contributed in 1765 to the "Miscellanies" published by Anna Maria Williams, especially one entitled "The Three Warnings," are considered her best productions.—See "Autobiography, Letters, and Literary Remains of Mrs. Piozzi," edited, with notes and an introductory account of her life and writings, by A. Hayward (London and Boston, 1861).

PIPE, a wine measure of rather indefinite capacity. In England it is rated at 126 wine gallons, or nearly 105 imperial gallons. A pipe of Cognac brandy is about 152¼ gallons; of Montpellier, 164⅞ gallons; of Bordeaux, 99¼ gallons; of port wine, 138 gallons; of sherry, 130; of madeira, 110, &c.

PIPE, a musical wind instrument, of which there have been many varieties. It is distinguished from the flute by being blown through one end instead of the side. The ancient Egyptians possessed both the flute and the pipe, as appears from the numerous drawings representing musical performances preserved in their tombs. The pipes were made of reeds, and some of them preserved in the British museum and in the collection at Leyden are merely plain tubes, from 7 to 15 inches in length, furnished with either 3 or 4 holes, and sometimes with a small mouthpiece of reed or thick straw, compressed at the end so as to leave a very narrow aperture. Some of the pipes consist of two tubes, to be held one in each hand, one giving a deep base sound, and the other a sharp tone for the tenor. The modern Egyptians use a rude imitation of it called the double *zummara*. Wilkinson remarks: "The double like the single pipe was at first of reed, and afterward of wood and other materials; and it was introduced both on solemn and festive occasions among the Egyptians, as among the Greeks. Men, but more frequently women, performed upon it, occasionally dancing as they played; and from its repeated occurrence in the sculptures of Thebes, it was evidently preferred to the single pipe." The Romans made use of a similar instrument called the *tibia*, and a person playing the double pipe was said *canere* or *cantare tibiis*, the two tubes evidently being distinct, and not connected by one mouthpiece. The *tibia dextra*, held in the right hand, was used to lead or commence a piece of music, and was hence called *incentiva*; while the *tibia sinistra*, held in the left hand, and following the former as an accompaniment, was called *succentiva*. The former is supposed to have been the base, and the latter the tenor or treble. The Phrygian pipes, giving a grave and solemn sound, were used at funerals. Others regulated the dance, and the stroke of the oars in rowing. In the Greek mythology the pipe was the favorite instrument of Pan, to whom its invention is ascribed, and of other rural deities. The pastoral character thus early associated with it has continued to the present day, and it is now found only in remote corners of Europe, among simple and primitive people. Throughout France, England, and other European countries, it was always played in conjunction with the tabor, a small drum.

PIPE, a tube for the conveyance of water, steam, gas, heated air, or other fluid, used for a great variety of purposes in the arts and in domestic economy. The materials of which pipes are constructed are also very various. Logs of wood have been extensively used for water pipes, the sticks being bored through the centre by long augers, and fitted together by means of the conical termination at one end entering the corresponding enlarged cavity of the next length. The pipes by which London was supplied with water were not many years since thus constructed of elm wood; and similar pipes of pine are still in common use in many places in the United States. They are defective from the decay they experience when buried in the ground, which soon destroys their usefulness, and also contaminates the water that passes through them. Cast iron pipes prove a valuable substitute for wooden pipes. They can be made of any size and to bear any desired amount of pressure. They are jointed together either by projecting flanges around each end, through which screw bolts are passed, a flat ring washer of some material appropriate to the use to which the pipes are to be put being laid between the two flanges; or one of the ends of each pipe is cast with a socket large enough to admit the end of the next pipe for a short distance. The joint is then made tight by packing in hemp, and following this with melted lead, or, if it is to be exposed to heat, by sal ammoniac and iron turnings. This mixture being dampened, a rapid oxidation of the iron turnings takes place, by which they increase in bulk and become tightly set in the joint, completely filling it up. For the water works of Glasgow and Dundee the cast iron pipes have been made of late with the socket or faucet end bored out to a true taper and accurately fitted to the corresponding smaller or spigot end, which is turned in a lathe. By coating the spigot end with hydraulic cement of the consistency of paint, laid on with a brush, a tight joint is secured without the necessity of any packing; but to make this still more sure, the precaution has been adopted by Mr. James Leslie of boring out a groove around the inside of the mouth of the faucet, into which melted lead may be poured to form a ring. Both the water and new gas pipes of Dundee are bored and turned, and the process has proved perfectly satisfactory and economical. The risk to which water pipes are subject is breakage at the joints from their being undermined by excavations for sewers or other purposes. Great damage has thus been done to the water pipes at Edinburgh, which are mostly of socket joints secured with lead and yarn. In Montreal and Hamilton, Canada West, turned and bored pipes procured from Scotland have been laid for the water works, the largest size of the pipes being 18 inches diameter. Another kind of joint is formed by bringing together two ends of pipes, cast of the same diameter throughout, and shrinking upon these a collar of wrought iron. Such joinings, adding little to the diameter, are convenient for long pieces of pipe, which are to be driven down into the ground, as those used at the natural oil wells in Pennsylvania. (See PETROLEUM.) Water pipes have also been successfully made of hydraulic cement encased in thin sheet iron. (See AQUEDUCT, to which also reference may be made for an account of the different sizes of water pipes in use in the United States.) The small water pipes called service pipes are chiefly of lead, notwithstanding the serious objection of their imparting poisonous properties to the water. (See LEAD.) Various expedients have been devised for protecting the inner surface of the pipes, as by a lining of tin, of gutta percha, and of pitch, and pipes of block tin and of gutta percha have been manufactured to take their place altogether. The former, however, have proved too expensive for general use, and those of gutta percha, at least of the ordinary qualities of that article, are liable to decay.—Wrought iron pipes, such as are now used in immense quantities for steam and gas purposes, are of recent invention. In the early part of the present century, when gas was first applied to illumination, old musket barrels were sought for and fitted to screw together to serve for conveying the gas; and it was not until 1824 that processes of making wrought iron tubes were invented and patented in England. Various modes of constructing these pipes have since been introduced, differing from each other chiefly in the manner of welding together the edges of the long strip of iron, as this is turned up into the circular form. By some manufacturers a mandril was employed, upon which the edges of the pipe when lapped were beaten together; and by others the mandril was dispensed with, the scrip or "skelp" of iron being taken from the furnace almost at the point of fusion, and by the chain of a draw bench dragged through a pair of tongs with two bell-mouthed jaws, in which the edges are strongly compressed together and welded.—Copper pipes are extensively employed in distilleries of different kinds and other chemical operations, and to protect them from corrosion they are often tinned within. Brass pipes are used in situations exposed to great heat, as about steam boilers, and especially for the tubes of tubular boilers. Pipes have been made of zinc as a proposed substitute for lead, and also of an alloy of zinc and lead. Pipes for conveying gas have recently been made in France and England of bituminized paper. M. Jaloureau, a contractor for paving Paris and other towns in France with bituminous concrete, noticing the stiffness and solidity of a roll of paper that had been left some time coated with bitumen, was led to prepare some pipes in this manner, which proved so strong and impervious, that experiments were made with them by direction of the municipal authorities of Paris to test their durability as gas pipes buried in the earth; and at the end of 12 months, on being taken from the ground, it is said they appeared like new pipes. A piece of the pipe, of 2 inches diameter of bore and ½ inch thickness of material, supported upon bearings 3 feet apart, was broken only by a weight of 428 lbs.; and specimens of only ¼ inch thickness were found capable of resisting a pressure of 250 lbs. to the square inch. Pipes cut out of solid blocks of stone were in use to some extent in London in the early part of the present century, and several ingenious modes of preparing them were contrived. By one method circular cutters were made, the first one to remove a central core from the block, and larger ones followed, each removing a hollow cylinder of its own diameter. The pipes, though good in other respects, were costly and liable to be broken in the joints by the jarring occasioned by carriages passing over them. Baked earthenware pipes are now prepared for the conveyance of water, and especially for drains. (See DRAINAGE.)

PIPE, TOBACCO, a bowl and connecting tube made of baked clay, stone, or other material, and used in smoking tobacco. Clay pipes, with slender stems of 6 inches to a foot or more in length, have been largely supplied to commerce from potteries devoted to this manufacture in London and other places in England, the clay, which is a peculiarly white and adhesive variety, being obtained from Purbeck in Dorsetshire. The brittle character of the pipes is in part compensated for by their cheapness; and though they are now giving place to more durable kinds made of other clays, of porcelain, and even of wood, the consumption of the old-fashioned clay pipes is still large among the laboring classes in all parts of the United States, as well as in other countries. But many earthenware pipe bowls are now made without the stem, some of plain form, and some with grotesque heads and figures of a great variety of shapes. These are used with a stem of cane or other wood, which any one can fit to them. Upon the American continent pipes have been in use from very remote periods. They are found in the ancient mounds of the West together with other relics of an unknown race, elaborately carved in stone into fanciful shapes, often resembling various animals of the country. In northern New York and in Cayuga co. they are frequently discovered in ploughing the land. Some are of soapstone and others of baked clay. In the account of the discovery of the Hudson river by Robert Juet, mention is made of "red copper tobacco pipes and other things of copper, which the savages did wear about their necks." In the N. W. territory, upon the summit of the dividing ridge between the St. Peter's and the Missouri rivers, called the Coteau des Prairies, and in the latitude of St. Anthony's falls, the Indians have long procured a peculiar variety of red steatite or soapstone, of which all the red stone pipes of that region are made. The locality is held in great reverence by the Indians, and they have strongly opposed any attempts of the whites to visit it. Catlin, however, succeeded in overcoming their scruples, and was shown the spot at the base of a long vertical wall of quartz, which lay in horizontal strata, the pipestone layers spreading under the adjoining prairie land of the ridge, whence it was obtained by digging a few feet in depth. He judged from the great extent of the excavations, and from the graves and ancient fortifications, that the place must have been frequented by different tribes of Indians for many centuries. ("American Journal of Science," vol. xxxviii., 1840.) The pipes made of this stone are heavy, and usually of rather plain form, decorated by bands and ornaments of lead, which appear to have been run into depressions made to receive it and then smoothed down. The stems are long and curiously carved sticks of hard wood, sometimes flat, frequently ornamented with gaily colored feathers of birds and horse hair dyed of scarlet hue. The most elaborate pipes are those of the Asiatics, especially the Persians and Turks. (See MEERSCHAUM.) The bowls are large and heavy, not intended to be held in the hand or carried about, and the stems are several feet long, sometimes made in part of spiral wire covered with a thin impervious coating of leather or other substance, so that this portion of them is very flexible. The mouthpiece is of ivory, silver, or amber, the last being preferred and much the most expensive. The principal portion of the amber product of Prussia is applied to this use, and some of the mouthpieces command very large prices. In the Turkish department of the great exhibition of 1851 there were 4 amber mouthpieces valued together at £1,000. The eastern *hookah* or *houkar* is a pipe of extraordinary size, and an instrument of such importance in the courts of the princes that an officer called the *houkar bourdar* is specially appointed to take care of it, and present the mouthpiece to his master for smoking. The large bowl of this pipe is set upon an air-tight vessel containing water, and a small tube from the pipe passes down into the water. The smoking tube is inserted into the side of this vessel, and communicates through a long flexible tube with the mouthpiece. By exhausting the air through this the smoke is forced down under the water, and entering the space above it passes into the stem freed by its contact with the water from some of the most acrid properties of the tobacco. The German pipes are of great variety, as well of material as of form. Those of porcelain are sometimes beautifully painted in the style of fine chinaware painting. Other pipes are of wood and of meerschaum, with long and with short stems.

PIPE CLAY. See CLAY, vol. v. p. 205.

PIPE FISH, the popular name of the subfamily *syngnathinæ* of the lophobranchiate order of marine acanthopterygious fishes, and particularly of the genus *syngnathus* (Linn.). The characters of the order have been given in the article LOPHOBRANCHS. In the subfamily the form is much elongated, and covered with a series of imbricated plates, and the gills are arranged in tufts instead of plates. The genus has a 7-sided body, the snout straight and cylindrical, and without spines; a single dorsal on the middle of the back, not on an elevated plane, the upper border of the back never in the same line with that of the tail; the upper border of the latter either continuous with the lateral line or interrupted where that ends; dorsal surface flat or slightly concave, and the rings of the body 24 to 27; the gill opening is circular and high up, and the ventrals are wanting; the jaws tubular, the mouth at the end; in some species the pectorals, anal, and caudal are wanting; the tail is not prehensile; the head in the same line with the body; the males have a caudal egg pouch under the tail, open in its whole extent. About 20 species are described, of which in Europe the best known is the great pipe fish (*S. acus*, Linn.), sometimes called needle fish; this has all the fins except the ventrals; it is found at low or high water, swimming slowly among sea weeds, feeding on small crustaceans and mollusks, marine worms, insects, and roe of fishes. In the male the posterior part of the abdomen is broader than the rest, with 2 soft flaps folding together and forming a kind of pouch for the reception of the eggs, which, it is believed, are placed there by the female; it is greatly attached to the young, which also, when small, are said to take refuge in the pouch; it is interesting to observe that whenever among fishes unusual care is taken of the eggs or young, this duty is performed by the males, while in other classes the females, assisted occasionally by their mates, protect and feed the young. It attains an average length of 18 inches, and is pale brown, transversely barred with darker brown; the tail is fan-shaped. Another species of the English coast is the *S. typhle* (Linn.), characterized by its deeper jaws; it is about 13 inches long, olive green, mottled and spotted with yellowish brown and white. Among the species which have no fins but the dorsal, and no subcaudal pouch, are the *S. æquoreus* (Linn.) of the British seas, about 20 inches long, of a yellowish color, with transverse pale lines and dark margins; the snake pipe fish (*S. ophidion*, Linn.), about 14 inches long, of the size of a goose quill, the tail ending in a point, and the color a uniform olive green; and the worm pipe fish (*S. lumbriciformis*, Jen.), only 5 or 6 inches long, of a dark olive green color. In America is the *S. Peckianus* (Storer), which attains a length of 12 inches; the color is olive brown, with numerous transverse darker bars, and yellowish below; pouch present, and all the fins except the anal, or the latter is exceedingly minute; eyes prominent and very movable. Another species, from New England and New York, less common, is the brown pipe fish (*S. fuscus*, Storer), of a general brownish color. It is very easy to see in the aquarium that the tail is not the sole nor the principal organ of locomotion in these fishes, and many species have no fin but the dorsal; when desirous of rapid progress, they move the body very much like an eel, but in ordinary locomotion the dorsal is the chief motor organ; this may be seen to make short and quick vibratory movements which pass in spiral waves along its border, like the screw of a propeller, and might well have suggested this motive power to naval architects. They have also a remarkable power of moving the eyes, even through an arc of 90°, and each independently of the other; this faculty is possessed by the family.—Other acanthopterous species of the family *aulostomidæ* are also called pipe fishes; these are characterized by the prolongation of the bones of the face into a long tube, at the end of which is the mouth; the ribs are short or absent, and the intestines have neither great dilatations nor many folds. In *fistularia* (Linn.) the mouth is small, with a nearly horizontal gape; the body long and slender, the head forming ⅓ or ¼ of the total length; branchiostegal rays 6 or 7; dorsal single and simple, opposite the anal; teeth small; one or two jointed filaments, sometimes as long as the body, issuing from between the deep forks of the caudal; air bladder very small; scales invisible. The serrated pipe fish (*F. serrata*, Bloch) attains a length of 28 to 30 inches, of which the caudal filament is 10 or 12; color light drab, with a narrow brownish blue band along the sides, the throat white, and the abdomen and irides silvery;

the snout with longitudinal serrated ridges; the lower jaw the longer and somewhat curved upward, with a fleshy protuberance at the chin; the shoulders covered with horny plates; the dorsal and anal triangular, pectorals quadrangular, ventrals very small and about midway between pectorals and anal; it is found from Massachusetts to the coast of Brazil. The tobacco pipe fish (*F. tabacaria*, Bloch), also American, is smaller, brownish with a row of pale spots, with the abdomen white in the middle, and the orbits spiny. In *aulostoma* (Lacép.) the dorsal is preceded by some free spines, the jaws toothless, the facial tube and body less slender, the latter scaly, the tail without filament, and the air bladder very large; the *A. Sinense* (Bloch) inhabits the Indian ocean. In *centriscus* (Linn.) there is the tubular snout, but the body is oval and compressed, trenchant on the abdomen; there is a spinous dorsal very far back, with a strong 1st spine, and a soft dorsal behind it; the body is covered with small scales. The *C. scolopax* (Linn.), called sea snipe and trumpet fish, is common in the Mediterranean; it is 4 or 5 inches long, reddish on the back and sides, and silvery on the belly, sometimes with a golden tinge; its flesh is delicate and esteemed. In *amphisile* (Klein) the back is cuirassed by broad scaly plates, and the strong dorsal spine is continued backward in the axis of the body, of which it actually forms the hinder extremity, the second dorsal and the anal being crowded backward and even on to the under surface; they are from the Indian ocean. The food of all these fishes consists of minute crustaceans and other marine animals, which they detach from various kinds of sea weed.

PIPPI. See Giulio Romano.

PIQUA, a city of Miami co., O., on the Great Miami river; pop. in 1860, 4,620. It is at the junction of the Dayton and Michigan and the Columbus and Indianapolis railroads, 72 m. W. from Columbus, and 88 m. N. from Cincinnati, with which and Toledo it is also connected by the Miami canal. The city is regularly laid out with wide streets, and 2 bridges connect it with Rossville and Huntersville, on the opposite side of the river. Water power is supplied by the waste of the canal, and there are numerous manufactories. The city contains a bank, a town hall, 3 newspaper offices, and 12 churches.

PIQUET, a game of cards played by two persons. The name is French, and refers to a phrase in the game, the *pique*, which has its equivalent in the English "point." The game is 100. The denominations of the score are the following: 1. *Carte blanche*, which is when a hand dealt contains no face card. This hand enables the holder to count 10, and is counted before any other. 2. Point, which is reckoned by the player who has the greater number of cards in any one suit, or, if both have an equal number, by the one who has the greater number of pips. In this count the face cards stand for 10, and the ace for 11. Whoever has point counts one for each card he holds. 3. Sequence, which is several cards in the same suit, following consecutively, counts 3, 4, 15, 16, 17, or 18, according as there are 3, 4, 5, 6, 7, or 8 consecutive cards. 4. The *quatorze*, which is 4 cards of equal value in 4 different suits, counts 14. 5. The cards are reckoned by the winner of the greater number of tricks, and count 10. 6. The *capot*, counted by a player who wins all the tricks, makes 30 toward the game, beside 10 reckoned for the cards. There are many similar implications in piquet, especially in the sequence, where the holder of the greater sequence, a *huitième*, or 8, is entitled to count for the *huitième*, and for every lesser sequence that it involves—a *tierce*, a *quart*, a *quint*, a *seizième*, and a *septième*—that is, 73. From an ordinary pack of cards the 2, 3, 4, 5, and 6 are discarded for piquet, and the other cards rank as at whist. The cards are dealt 2 by 2, until each player has 12, and the *talon* or stock is then placed upon the board. From this the elder hand has the right to draw 5 cards in their natural order, and must then discard the same number from his own hand. This discard affords him some opportunity to arrange his hand with reference to the various scores. It is imperative upon the elder hand to discard at least one card, but not the whole 5. If he discards less than 5 he has the privilege of looking at the cards left. His own discard is optional with the dealer, and if chosen follows after every other hand. Tricks are taken in the usual manner by the superior cards of the same suit.

PIR PANJAL, or the Saints' Mountain, a lofty range, forming part of the S. W. boundary of Cashmere, and separating it from the Punjaub. Its highest point, in or near lat. 33° 40' N., is about 15,000 feet above the sea. At the S. W. extremity is the pass of the same name, about 12,000 feet high, but below the limit of perpetual snow.—Pir Panjal is also the name of a river which rises in this range, and falls into the Jhylum in lat. 33° 16', long. 73° 38' E.

PIRACY, robbery upon the sea. Spelman says that *pirata* once meant in England sea knight or soldier; and he cites an instrument of the time of King Edgar, in which one of the witnesses styles himself *archipiratam*, that is, as Spelman translates it, admiral. He also quotes Asser and another ancient chronicler, who write that the war galleys of Alfred and of William the Conqueror were manned by *piratæ*. The legal definitions of pirate and piracy are derived from the civil law, whence they were transferred to the maritime and admiralty laws and the law of nations. The civil law applied *piratæ*, *prædones*, and *latrones* to the same kind of offenders; indeed, the latter terms were sometimes used interchangeably with the former. But the proper, and in fact the sole difference between the terms was that *prædones* and *latrones* described robbers upon land, while *piratæ* meant robbers on the sea.

The writers upon the civil, the international, and maritime codes agree in defining piracy as robbery or depredation on the sea. Strictly speaking, piracy is not an offence known to the common law. As it is a crime committed on the high seas, it is committed out of its jurisdiction. As Sir Charles Hedges said in the high court of admiralty in 1696: "Piracy is the sea term for a robbery committed within the jurisdiction of the admiralty." Until the statute 28 Henry VIII. it was exclusively a civil law offence, cognizable only by the admiralty courts. But the procedure under the forms and rules of the civil law includes no trial by jury, and it was plainly an encroachment on the liberties of the English subject that his life should be forfeited without judgment by his peers, according to the law of the land. Furthermore, as the statute itself recites, there could be under the civil law no conviction for a crime unless the accused plainly confessed it, or it were directly proved by witnesses who saw it committed. The statute therefore enacted that the offences which it contemplates should be judged in such shires and places as should be designated by the king's commission, and in the same form as if the alleged crime had been committed upon the land. This commission is directed to the admiral or his deputy, and to three or four others, among whom, says Blackstone, are usually two common law judges. The indictment is found and tried by grand and petit jury, and the trial follows, in other respects, the course of the common law. Yet it is to be observed that the court thus constituted is still essentially an admiralty court. The statute, said Chief Justice Mansfield, merely altered the mode of trial, but the jurisdiction of the court rests on the same foundation as before the act; it is regulated by the civil law and by maritime customs, grounded on the law of nations. Piracy, therefore, can be said to be an offence at common law only when this term is taken in its most comprehensive sense, and so inclusive of the law of nations.—In the United States, the cognizance of piracy is reserved by the constitution to the general government. The 8th section of the 1st article of that instrument gives to congress the power "to define and punish piracies and felonies committed on the high seas, and offences against the law of nations." Under this constitutional provision, and because the U. S. courts have no common law jurisdiction, the definition of piracy in our law is to be sought exclusively in the acts of congress, and it will be seen that they have materially enlarged the usual conception of the offence. Of the acts by which congress has exercised the authority conferred by the constitution, the earliest was that of April 30, 1790. It declared that murder or robbery committed on the high seas, or in any river, haven, or bay out of the jurisdiction of any particular state, or any other offence which, if committed within the body of a county, would by the laws of the United States be punishable with death, should be adjudged to be piracy; and if any captain or mariner should piratically and feloniously run away with any vessel, or any goods of the value of $50, or yield up any such vessel voluntarily to pirates, or if any seaman should by force attempt to hinder his commander from defending the ship or goods committed to his trust, every such offender should be adjudged a pirate and a felon, and be punishable with death. The terms murder and robbery in this act are to be understood as they are defined at common law. The words high seas apply to any waters near sea coasts which are beyond low water mark. The next act touching piracy was that of March 3, 1819, which was extended for two years by the act of May 15, 1820. After this period had elapsed, the act of Jan. 30, 1823, revived without limitation the first 4 sections of the act of 1819. These sections contained provisions authorizing public and private ships to seize pirates wherever they might be found. They are still in force. The 5th section of the act of 1819 was directed against those who should commit "piracy as defined by the law of nations;" and so long as it remained upon the statute book it conferred upon the U. S. courts a jurisdiction over piracy quite the same as that which is exercised over the offence in England. This section was not continued by the act of 1823, but seems to have been displaced by the 3d section of the intermediate statute of 1820. Indeed, Chancellor Kent says that this section is substantially a definition of piracy according to the law of nations. It runs as follows: "If any person shall upon the high seas, or in any open roadstead, or in any haven, basin, or bay, or in any river where the sea ebbs and flows, commit the crime of robbery in or upon any ship or vessel, or upon the lading thereof, or upon the crew, he shall be adjudged a pirate. . . . . If any person engaged in any piratical enterprise, or belonging to the crew of any piratical vessel, shall land and commit robbery on shore, such person shall also be adjudged a pirate, and upon conviction shall suffer death." The act of March 3, 1847, provides that subjects or citizens of foreign states found and taken on the seas making war on the United States, or cruising against the vessels and property thereof, or of the citizens of the same, contrary to the provisions of any treaty existing between the United States and the country of such persons, shall, when such acts are declared by such treaties to be piracy, be arraigned, tried, convicted, and punished in the courts of the United States. Finally, citizens of the United States who are engaged in the slave trade are declared by the statute of 1820 to be pirates, and upon conviction are to suffer death.—These are the existing laws concerning piracy. A review of the chief points which have been made in construction of them will present conveniently the American law of this offence. We have seen that, though the section which expressly gave jurisdiction over "piracy as defined by the law of nations" was limited in its duration, yet a subsequent act contained provisions which were substantially declaratory of the international law in this respect. It is also to be observed, that the still operative sections of the act of 1819, which provide for the seizure of those who shall have attempted or committed any piratical aggression, search, restraint, or depredation, necessarily require construction according to the law of nations. Thus, in commenting on this word piratical, Judge Story said that the statute intended by it all acts or offences which pirates are in the habit of perpetrating; and that, in the case before him, the wilful sinking and destroying of an innocent merchant ship, without any other object than to gratify a lawless appetite for mischief, was a piratical aggression, in the sense of the law of nations, and of the act of congress, just as much as if the act had been done for the purposes of plunder. The act of 1790 declares every offence committed at sea to be piracy, which would be punishable with death if committed on land. This statute, says Chancellor Kent, may be considered as enlarging the definition so as to include not only every offence which is piracy by the law of nations and the act of congress of 1819, but also other offences which were not piracy until made so by statute. The act of 1820, which declares slave traders pirates, can apply only where the municipal jurisdiction of the United States extends, and must be limited to American citizens or to foreigners on board of American ships. It has been repeatedly decided that the slave trade is not an offence under the law of nations; nor is it piracy except when it is made so by statute or treaty. Under these acts, the United States courts take jurisdiction of those offences alone which are committed by or upon citizens of the United States, or over those which, though not committed upon American citizens, are yet committed by those who acknowledge no national authority, but are the common enemies of all nations, and may therefore be justly punished by any. Our courts assume no jurisdiction over those who are under the acknowledged authority of a foreign state.—The general rule, that robbery on the high seas is piracy, has no exception or qualification in favor of commissioned privateers in any act of congress, or in the law of nations; and accordingly a privateer bearing a commission of the United States, who feloniously seized the goods of a neutral, that is to say, robbed him on the high seas, was adjudged a pirate.

PIRÆUS, the port of Athens, situated about 5 m. S. W. from the city, on a peninsula of the same name. It has 3 harbors, 2 on the E. side, anciently called Munychia (now Phanari) and Zea (now Stratiotiki), and one large one on the W. side, called simply Piræus or the Harbor. The last was anciently divided into two parts, the one on the right, called Cantharus, being appropriated to ships of war, and the one on the left, called Emporium, being used for merchant vessels. Previous to the Persian war Phalerum had been the port of Athens, but Themistocles, seeing the natural advantages of the Piræus, surrounded the peninsula with a line of fortifications 60 stadia in circumference and 60 feet high. The northern of the two long walls connecting Piræus with the city was begun by the advice of Pericles in 457 B. C. and finished in 456, and the southern, called the intermediate, was built between 456 and 431. They were destroyed by the Lacedæmonians at the end of the Peloponnesian war, but after the naval victory of Cnidus were rebuilt by Conon, and in later times fell into decay. Piræus was taken by Sylla, and never recovered from the blow inflicted upon it by that general, who destroyed its fortifications and arsenals. It had become even in the time of Strabo an insignificant village. The modern town has sprung up entirely since 1834, and in 1852 its population was 5,526. It contains 4 churches, 6 schools, a custom house, and a lazaretto. The harbor of Piræus was called during the middle ages Drako or Porto Leone, but it has now recovered its original name. It is deep and safe, though the entrance is somewhat difficult. The number of vessels belonging to the port in 1855 was 496, and the value of the imports in that year was $1,350,000.

PIRANESI, Giovanni Battista, an Italian engraver, designer, and architect, born in Venice in 1720, died in Rome, Nov. 9, 1778. He studied architecture in Rome, where he resided more than 40 years, devoting himself principally to the production of engravings of architectural subjects and ancient ruins. Among the most important are the *Antichita Romana* (208 plates, 4 vols. atlas folio, 1756); the *Antichita d'Albano* (35 plates, 1764–'5); *Magnificenza dei Romani* (44 plates, 1761); *Vedute di Roma* (2 vols., 130 plates of modern buildings in Rome); the *Campus Martius* (54 plates, 1762); *Statue antiche* (1781–'4), a collection of 850 subjects; "Antiquities of Herculaneum and Pompeii," &c. Piranesi drew at once on the plate, and finished it by etching, hardly using the graver. For spirit and vigor of execution and bold effect his works are unique in art. A complete set of them, comprising nearly 2,000 subjects in 30 folio volumes, was published in Paris by his son Francesco in the early part of the 19th century. The plates are now in the possession of the Roman government, and are deposited in the Vatican.

PIRATE. See Piracy.

PIRON, Alexis, a French wit and dramatist, born in Dijon, July 9, 1689, died Jan. 23, 1773. He was the son of an apothecary who was celebrated in his province for his *noëls* or satirical songs. Alexis studied law, but, unable to follow the profession on account of his father's reduced circumstances, he earned a scanty living as a copyist, and at the age of 30 removed to Paris, where he was engaged to write light comedies for the *théâtre de la foire*. His first play produced there, *Arlequin Deuca-*

lion, which he wrote in about 2 days, was a decided success, and he followed the profession of a light dramatist until he was encouraged to attempt a higher flight by his friend Crébillon. His first 5-act comedy, *Les fils ingrats, ou l'école des pères*, was performed in 1728 at the French theatre, with moderate applause. Of two tragedies which he afterward produced, one failed and the other succeeded. Two comedies, now forgotten, followed; and finally in 1739 *La métromanie, ou le poëte*, his masterpiece and one of the best plays in French literature, appeared. In 1741 he produced *Fernand Cortez*, a tragedy, which failed. In concert with Collé, Panard, and others, he established the singing society known as *le caveau*, and gave much of his time to convivial pleasures. His wit and readiness at repartee were almost proverbial, and Voltaire himself was careful not to quarrel with him. The French academy, which had been frequently the object of his satire, nevertheless elected him a member in 1753; but the king refused his assent, on account of a licentious poem composed by Piron in his youth, whereupon he wrote his own epitaph: "Here lies Piron, who was nothing, not even an academician!" His works have been published at Paris in 7 vols. 8vo. (1776).

PISA, an ancient city of Peloponnesus, and the capital of the middle district of Elis called Pisatis, situated in the lower valley of the Alpheus, between Harpina and Olympia, a short distance E. from the latter. It was first celebrated as the residence of Pelops, after which it appears to have declined. Subsequently it became the head of a confederacy of 8 states, and had the presidency of the Olympic festival, of which it was deprived by the neighboring Eleans, recovering it however in the 34th Olympiad, 644 B. C. This privilege thenceforth became a continual cause of war between Pisa and the various rulers of Elis, until in the 52d Olympiad the Eleans were finally successful, and Pisa was razed to the ground. So complete was its destruction, that even its existence was disputed in the time of Strabo.

PISA, a city of Italy, and capital of a prefecture of the same name in Tuscany, situated upon both sides of the Arno, about 7 m. from its mouth, 13 m. N. N. E. from Leghorn, and 50 m. W. from Florence; pop. in 1858, 23,000. It has communication by railway with Leghorn, Lucca, and Florence. It is built on a marshy fertile plain, enclosed on the E. by the Apennines, and open on the W. to that part of the Mediterranean which is called the Tuscan sea. It is surrounded by an ancient wall a little more than 5 m. in extent, with 5 gates. The circuit of the wall enclosed originally much garden ground, and the unoccupied space has been increased by the destruction of many convents, giving the outer parts of the city a desolate appearance. The Arno, here a muddy stream, forms almost a semicircle within the walls. It is lined upon both sides with stone quays, and spanned by 3 bridges. The Ponte alla Fortezza, in the E., has 4 arches. Next below it is the Ponte del Mezzo, or middle bridge, with 3 arches; it is built of marble, and is esteemed the finest bridge in Europe. The Ponte à Mare is the westernmost; it has 5 arches, was built in 1331, and restored a century later by Brunelleschi. The long wide streets upon either side of the Arno, called Lung' Arno, are gay and cheerful. The Palazzo Uppizzinghi is said to have been designed by Michel Angelo, as also its neighbor the Palazzo Lanfranchi. Among the interesting edifices on the S. side of the river are the Loggie di Banchi, erected in 1605, and now used for a corn market; and the academy of fine arts, founded by Napoleon in 1812. In a large grass-grown square at the extreme northern angle of the city stand four of the most remarkable structures in the world, all built of white marble in corresponding style: the cathedral, with its baptistery, its *campanile* or belfry (the celebrated leaning tower), and the Campo Santo or cemetery. The cathedral was erected to celebrate a triumph of the Pisans in the harbor of Palermo in 1063, when allied with the Normans to drive the Saracens out of Sicily. It was begun in 1064 and finished in 1118, is in the form of a Latin cross, 311 feet long and 106 feet wide in the interior, and is richly ornamented with ancient stained glass, paintings, and statuary, including masterpieces by Beccafumi, Andrea del Sarto, Staggi, Nicola Pisano, and others. There are 12 altars in the nave and transepts said to have been designed by Michel Angelo. It was greatly injured by a fire in 1596, and its foundations have settled so that every part of the original structure is out of line. The baptistery, commenced in 1152, but probably not finished till the 14th century, is a circular building 100 feet in diameter and 179 feet in extreme height, and has fine mosaic pavements, elaborately carved columns, and numerous bass-reliefs. The campanile was begun in 1174. It is 190 feet high, and consists of two concentric circular walls, each 2 feet thick, with a stairway running up between them. The well inside the inner wall is 2 feet in diameter. The tower is divided into 8 stories, each having an outside gallery of 7 feet projection, and the topmost story overhanging the base about 15 feet, though, as the centre of gravity is still 10 feet within the base, the building is perfectly safe. It has been supposed that this inclination was intentional; but the opinion that the foundation has sunk is no doubt correct. It is most likely that the defective foundation became perceptible before the tower had reached one half its height, as at that elevation the unequal length of the columns exhibits an endeavor to restore the perpendicular, and at about the same place the walls are strengthened with iron bars. The Campo Santo, the archetype of all similar cemeteries in Italy, is a structure 415½ feet long and 137 feet 10 inches wide, commenced in 1278, and enclosing a mound of earth brought from Mt. Calvary many years before by Archbishop Ubaldo when expelled from Palestine by Saladin. It contains a rich collection of monuments, including many Roman sarcophagi, and the walls are covered with ancient frescoes. The university of Pisa is among the most celebrated in Italy. Its degrees, except in divinity and canon law, are accessible to persons of all creeds. Galileo was one of its professors. Its library contains 55,000 volumes. Pisa is supplied with water conveyed from the Valle d'Asciano by an aqueduct, begun in 1613, of 1,000 arches and 4 m. long, and having 8 reservoirs. Soap, glass, and vitriol are made to some extent, but Pisa has little importance either as a manufacturing or commercial city.—Pisa was an ancient city of Etruria, and its origin, through the identity of name, has been ascribed, no doubt incorrectly, to a colony from the Peloponnesian city. It is first mentioned as a dependency of Rome in 225 B. C. In the 10th century it was the first among the commercial republics of Italy. In the 13th century a struggle with Genoa began, which ended disastrously for Pisa. It took part in the contests of the Guelphs and Ghibellines, in which Count Ugolino with two of his sons and two grandsons were imprisoned in a tower in Pisa and starved to death. It was taken by the French in 1799.

PISANO, the name applied to several artists of Pisa distinguished at the period of the revival of the arts in Italy. I. Giunta, commonly called Giunta di Pisa, born probably in 1180 or 1190, died about 1250. He is the earliest Tuscan painter of whom there is any record, having been many years anterior to Cimabue, and probably acquired a knowledge of his art from the Byzantine painters who settled in Pisa after the capture of Constantinople by the Venetians. II. Nicola, the greatest artist of the 13th century, born about 1200, died about 1275. He was one of the most eminent of the restorers of sculpture, and among the earliest to return to the study of the antique. As an architect he was almost equally distinguished, and his works in Florence, Naples, Pisa, Venice, and other Italian cities were numerous and splendid. He was the first original artist of the renaissance, and gave the first impulse to the movement, successfully carried out by Giotto and his school, for the rejection of the Byzantine types of art and the adoption of those founded on nature. III. Giovanni, son and pupil of the preceding, born about 1235, died in 1320. His chief work is the Campo Santo or cemetery of Pisa. As a sculptor he was a worthy successor of his father, and became celebrated throughout Italy. IV. Andrea, a sculptor and architect, distinguished as a metal founder, born about 1280, died in Florence in 1345. He executed works in sculpture for various churches of Florence, but is best known by his bronze gates for the baptistery of St. John in that city. As an architect he designed several churches in Tuscany, and according to Vasari the arsenal at Venice.

PISCATAQUA, a river flowing between New Hampshire and Maine. It rises in East pond between the towns of Wakefield, N. H., and Newfield, Me.; thence to Berwick Lower falls it is called Salmon Falls river, after which until its junction with the Cocheco it is known as the Newichawannoc; thence to the ocean, which it enters about 3 m. below Portsmouth, it has the name Piscataqua. The harbor, from Portsmouth to the sea, owing to the strong tides, is not much obstructed by ice, and is one of the best in the United States.

PISCATAQUIS, a N. co. of Me., drained by the Piscataquis and the west branch of the Penobscot and their tributaries; area, 3,750 sq. m.; pop. in 1860, 15,032. Its surface is dotted over with hills, the highest of which is Mount Katahdin, and contains a large number of lakes, of which the principal are Sebec, Pemadumcook, Carribou, Chesuncook, and Moosehead; the last named is the largest, and is 35 m. long by from 4 to 12 wide. A large portion of the land is yet unsettled. The productions in 1850 were 14,646 bushels of wheat, 48,925 of Indian corn, 147,034 of potatoes, 171,220 of oats, 21,746 tons of hay, 54,334 lbs. of wool, and 349,576 of butter. There were 3 grist mills, 20 saw mills, 1 woollen and 2 flannel factories, 25 churches, and 6,055 pupils attending public schools. Capital, Dover.

PISCICULTURE. See Fishes, vol. vii. p. 535.

PISE, Charles Constantine, D.D., an American clergyman and author, born in Annapolis, Md., in 1802. His father was an Italian of an ancient noble family, his mother a native of Philadelphia. He was educated in the Roman Catholic faith, and after graduating at Georgetown college under the care of the Jesuits went to Rome to study theology. After about 2 years' absence he was obliged to return home in consequence of the death of his father. He then entered the seminary of Mount St. Mary's, Emmittsburg, where he taught rhetoric and poetry, and finished his theological studies under Dr. Bruté, afterward bishop of Vincennes. Ordained priest by the archbishop of Baltimore in 1825, he began his pastoral duties at Frederictown, Md., and about 6 months afterward was called to the cathedral at Baltimore, where he wrote his "History of the Church from its Establishment to the Reformation" (5 vols. 8vo., Baltimore, 1830); "Father Rowland," a tale, in answer to "Father Clement;" and "The Pleasures of Religion, and other Poems." His health failing, he again visited Rome, where he received the degree of D.D., and the honorary title of knight of the Roman empire. After his return to the United States he was associated with the Rev. Mr. Matthews in the pastorship of St. Patrick's church, Washington, and through the influence of Henry Clay, who became his warm personal friend, was appointed chaplain of the U. S. senate. Mr. Clay also offered him the chair of rhetoric in Transylvania university, which he declined. At the invitation of Dr. Dubois, bishop of New York, he removed to the latter city, and was settled over several churches successively, the last being St. Peter's in Barclay street. During a journey to Ireland on business connected with the church he sketched the scenery of the country and the manners of the people in his "Horæ Vagabundæ." In 1849 he resigned his position at St. Peter's, purchased the Emmanuel church in Brooklyn, and dedicated it to Catholic worship under the patronage of St. Charles Borromeo. Of this he is still pastor. In 1858 he delivered a Latin ode at Emmittsburg on occasion of the 50th anniversary of the foundation of Mount St. Mary's college. Dr. Pise is one of the most prominent Catholic clergymen in America, both as a lecturer and preacher. Beside numerous fugitive pieces and translations of the hymns of the breviary, he has written a poem entitled "The Acts of the Apostles;" "Zenosius, or the Pilgrim Convert;" "Indian Cottage, an Unitarian Story;" "Aletheia, or Letters on the Truth of the Catholic Doctrines;" "Letters to Ada;" "Christianity and the Church;" "Lives of St. Ignatius and his first Companions;" "Notes on a Protestant Catechism, &c.;" and "The Catholic Bride," translated from the Italian. He has nearly ready for the press an epic poem in 4 cantos.

PISIDIA, in ancient geography, a province in Asia Minor, bounded N. by Phrygia Paroreos, E. by Isauria and Cilicia, S. by Pamphylia, and W. by Lycia, Caria, and Phrygia. It became a separate province on the division of the Roman empire by Constantine the Great, having previously been included either under Phrygia or Pamphylia. Olives, salt, iris, a root from which perfumes were manufactured, and the wine of Amblada, highly prized by the ancient physicians, were produced. The chief towns were Antiochia, Sagalassus, and Selge, the last mentioned being the most important. The inhabitants were mountaineers, never conquered either by the Syrian kings or by the Romans, although the latter held possession of some of their chief towns. In the time of Strabo they were ruled over by petty chiefs, and derived their subsistence mainly from plundering their neighbors. The mountainous parts of the ancient Pisidia are now inhabited by Caramanians, a wild predatory people. The country is rarely visited and little known.

PISISTRATUS, tyrant of Athens, born about 612 B. C., died in 527. He traced his descent to the Homeric Nestor and the Pylian kings. Distinguished for mental and physical endowments, he became the friend of his kinsman Solon, and accompanied him in the expedition for the recovery of Salamis. After the adoption of the constitution of Solon, Athens was divided into 3 parties: the proprietors of the plain, headed by Lycurgus; the party of the coast, headed by Megacles, the son of Alcmæon; and the party of the highlands, consisting of the poorer classes, headed by Pisistratus. Having wounded himself, Pisistratus appeared one day in the agora, complaining that he had been attacked, and asking for a guard. A company of 50 club-men was assigned him, which soon being increased, he seized the acropolis, and compelled his leading opponents to flee. Strenuous resistance was made by Solon, who however was unable to effect any thing, and appears not to have been molested. The seizure of the citadel took place in 560; but the chronology of the ensuing events is confused. Pisistratus did not long enjoy his elevation. A coalition of his opponents was formed, and he was driven from the city; but dissensions arose among them, and overtures were made to Pisistratus by Megacles, who offered him the sovereignty on condition that he should marry his daughter. This was agreed to, and Pisistratus entered Athens in a chariot by the side of a stately woman named Phya, clothed in the costume of the goddess Athena, heralds going before and crying out: "Athenians, cordially receive Pisistratus, whom Athena has honored above all other men, and is now bringing back into her own acropolis." He thus gained possession of the government, and married the daughter of Megacles; but not choosing to have children by a member of a family deemed to be accursed, he so incensed the Alcmæonids that they again united with the party of Lycurgus, and expelled him. Retiring to Eretria in Eubœa, he spent the 10 years of his exile in making preparations for his return, and at the expiration of that time landed at Marathon with mercenaries and troops led by Lygdamis of Naxos, and succeeded in reëstablishing himself in power. He now took into pay a body of Thracian troops, exiled the Alcmæonids, and kept the children of many of the principal citizens as hostages. His reign, however, seems to have been mild, and received the commendation of Herodotus, Thucydides, and Aristotle. But the last named imputes to him the design of impoverishing as well as employing his subjects by undertaking great works. This view is supported by the scale upon which the temple of the Olympian Jupiter was planned, and which remained unfinished until the time of Hadrian. Among other acts he purified the island of Delos by removing the dead bodies buried within sight of the temple. He is also said to have instituted the greater Panathenaic festival. Under his encouragement the earliest form of tragedy appears to have been brought into Athens, and the poems of Homer were collected and written down. He also made a collection of other works, which Aulus Gellius calls a library. He conquered Naxos, placing Lygdamis upon the throne, and wrested Sigeum from the Mitylenæans. He was succeeded by his sons. (See HIPPARCHUS AND HIPPIAS.)

PISSELEU, ANNE DE. See ÉTAMPES, DUCHESS D'.

PISTACHIO (*pistacia vera*, Linn.), a small tree indigenous to Syria, growing 20 feet high, with deciduous, unequal, pinnate leaves of 3 to 5 leaflets; diœcious, apetalous flowers, arranged in short branching racemes from the old wood; the fruit a drupe of a reddish color, with a thin rind and a brittle 2-valved shell containing an almond-like seed, much used by European confectioners. The pistachio tree is comprised in the natural order *anacardiaceæ* or terebinths, trees or shrubs remarkable for their caustic, gummy, resinous, and even milky juices. The *pistacia vera* is clothed with gray bark, its branches spreading and not numerous, its leaves winged, alternate, and on long petioles. The kernel of the pistachio nut is oily and mild to the taste; it is sometimes eaten raw, but more frequently in a dried state like almonds. The tree is cultivated in France and Italy; it will grow in any good garden soil, and can be propagated from cuttings and by seeds. It is recommended for ornament on account of the beauty of its foliage. There are several other species well known to botanists.

PISTIL, in botany, that part of the flower whose office is to elaborate the seed. The pistil occupies the most central part of the blossom, and is one of its essential organs. It may be regarded morphologically as the end of a branch or flower stalk. It consists of 3 parts, viz.: the ovary, a hollow case containing rudimentary seeds called ovules; the style, which is the tapering part above, and which may be very much elongated, or very short or even wholly wanting; and the stigma, which is the tip or some other part of the style, or when the style is wanting the summit of the ovary. The office of the stigma is to catch and detain the pollen, so that it may fertilize the ovules which are afterward to grow into perfect seeds.

PISTOJA, or PISTOIA (anc. *Pistoria* or *Pistorium*), a fortified city of Tuscany, in the prefecture of Florence, on the left bank of the Ombrone, 21 m. N. W. from Florence; pop. 12,000. It has a cathedral built in the 12th century. Iron, wool, silk, and leather are manufactured. In its neighborhood Catiline was defeated and slain (62 B. C.).

PISTOL, a small firearm to be carried about one's person, or in holsters at the saddle bow, named from the city of Pistoja in Tuscany, where it is stated pistols were first made. Mention is made of their use in 1544 under the reign of Francis I. of France, and in the time of his successor Henry II. the horsemen who carried them were called pistoliers. Being intended only for hand-to-hand encounters, no attempts were made to give them accuracy of aim, which indeed was altogether impracticable until the adoption of the firelock, toward the close of the 17th century, and such accuracy moreover was considered incompatible with their necessary shortness of barrel. It is indeed only within a few years past that pistols have been generally provided with sights. Yet some remarkable pistols were produced at an early period, which embody the peculiar principles of the most perfect instruments of the present day. A Spanish pistol made about the end of the 17th century is described by Greener as the most complete instrument of the kind which he had seen. "By moving a lever toward the but end while the muzzle is depressed, the lock is primed, half cocked, and the hammer shut down; return the lever, the powder is in the breech and the ball before it. We have seen it fire 26 shots without a failure and with one supply of ammunition. The magazine was in two tubes in the stock." The piece was finally burst in firing. It is stated by the same authority (Greener's "Gunnery in 1858," p. [illegible] that in the museum of artillery in Paris are revolving rifles, and swords and revolving pistols combined in one, which were produced more than 200 years ago. Some have 4, 5, and charge chambers. They would have prevented the establishment of Colt's patent, had not this been based on his causing the chambers to revolve in the act of cocking the lock. These improved pieces, so extraordinary for the time, never came into general use in consequence of their unavoidable clumsiness, each chamber having its own hammer and pan, and the inconvenience of keeping these primed. Such instruments, moreover, must have been extremely expensive, and but few workmen could have made them. Pistols of simpler form displaced them entirely; and these for the most part were clumsy instruments, especially the pistols made for naval service to be used in the close contests in boarding. They carried large balls, and were often double-barrelled, each barrel having its own lock and pan. Many were highly decorated with elaborate mountings upon their stocks, and an exterior finish of damaskeening or other ornamentation of the barrels; but little was done to perfect the character of barrels or of the locks. Great value was attached to these ornaments, and pistols of the Turks and Greeks are still remarkable for the extent to which this elaborate finish is carried.—Such was the character of pistols up to the time when Mr. Samuel Colt of Hartford, Conn., directed his attention to their improvement, and succeeded in bringing the instrument to a state of perfection never before attained. (See COLT, SAMUEL.) His first plan was to increase the number of discharges by arranging several barrels in one cylindrical group around a central spindle, and cause them to turn by each cocking of the lock sufficiently far to bring another barrel under the hammer. All the barrels being first loaded, they might then be discharged as rapidly as the hammer could be raised and the trigger pulled. Pistols of this kind have since been in use, but the plan finally adopted by Colt was to make a revolving chambered breech for the charges and a single barrel, in connection with which each chamber was brought in succession by drawing back the hammer to the full catch. At half cock the chamber is free to be turned round by hand, and in this state the receptacles are loaded by pouring in powder and placing a ball in each directly upon the powder, without wadding. A ramrod is permanently attached to the under side of the barrel, and is so contrived that by bringing down its free end it acts as a lever and strongly presses a short rod into one of the receptacles, driving the ball home, and effectually shutting in the powder. The charges are all thus rapidly introduced and secured, and percussion caps being placed on the nipples with which the chamber is provided, the piece is ready for service. The pistols are constructed with extreme nicety to guard against lateral escape of the fire and smoke, which by fouling the parts would obstruct the movements; and accuracy of aim is secured by a sight at the end of the barrel, and another in the hammer at the other end when this is set at full cock. The great value of Colt's pistols was fully established in the Texan and afterward in the Mexican war, and they proved of inestimable service to the allied armies in the Crimean war, and also to the English in their late encounter with the rebels in India. Still they failed to give entire satisfaction because of the necessity of stopping at every fire to cock the piece for the next shot. In several English and American pistols devices have been introduced for meeting this objection, and the pistols of Trantner and Dean of England have acquired much celebrity for the rapidity with which they may be fired; the pulling of the trigger raises the hammer to the full cock, when it is suddenly let go, and the action being repeated the same motion brings round another chamber which is immediately discharged. Several officers provided with these pistols, who were engaged at the battle of Inkerman, certified that they must have been cut down had there been the slightest delay for cocking their pistols. But others object to the *form* of lock on the ground that by the sudden liberation of the mainspring as it is pulled up, the aim is disturbed and the fire cannot be made with the accuracy of other pistols. Trantner, whose pistols are considered the best made in England, introduced some other modifications, one of which was the use of a patent lubricating bullet with a lubricating composition, by the use of which the fouling of the barrel is effectually prevented, and the piece may be fired several hundred times without cleaning. The great advantage of applying grease for this purpose has long been fully appreciated by our marksmen, and without it the barrel is soon obstructed with lead to such a degree that the balls fly very wild. The pistol made by Savage at Middletown, Conn., and now used very generally in the U. S. cavalry service, meets the objection against the English self-cocking pistols of their aim being destroyed by the introduction of a double trigger, one part of which is fitted for the middle finger and the other for the forefinger of the right hand. A pull with the one brings the hammer up and a fresh chamber round to its place. The pull being released, the pistol remains cocked and the cylinder springs forward, making its connection with the barrel tight. The trigger may be instantly pulled with the forefinger, discharging the piece. These movements may be continued with rapidity till the 6 barrels are discharged without removing the right hand from its place or calling the other into use. The large size and length of the pistol, and the accuracy with which it may be fired by means of its two sights, render it a formidable weapon even at long shots, and it is evidently extremely well adapted for use on horseback. At distances up to 150 yards a good marksman ought not to miss in any number of shots a target as large as a man. But for close encounters the small cartridge-loading pistols are the most recent and much the most efficient weapons. Several varieties of these have been brought out by American inventors, and are known as Smith and Wesson's, Warner's, and Allen's. They all have the revolving cylinder, which contains 7 chambers; and they differ from each other chiefly in the manner in which the cartridges are inserted into these chambers. In Smith and Wesson's the piece is so constructed that the barrel may be instantly turned at right angles with the stock, setting the cylinder free to be slipped off from the pin on which it turns, and the cartridges may then be slipped into the rear end of the chambers. These cartridges are copper caps resembling percussion caps, large enough to exactly fit the bore of the chamber. At the close end they are enlarged so as to form round the edges a thin receptacle for the percussion priming, and present a flange-like impediment to the cap entering entirely into the bore. Sufficient powder for a charge is placed in the base of the cap, and upon this the Minié ball is inserted, acting as a tight stopple, and projecting from the end like a cork from the neck of a phial. Whether carried in the pocket or introduced in the chambers of the pistol, the cartridges are always protected from dampness, and no injury can result to the barrel, however long they may be allowed to remain in it. They are prepared by the manufacturers and put up in boxes like percussion caps, and thus the use of powder flasks, percussion caps, and separate balls is entirely dispensed with, and the piece is completely charged with no more trouble and expenditure of time than usually attends the fixing of percussion caps upon the nipples. The slight projection of the cartridge cap outside the cylinder does not interfere with its revolution, which is effected by bringing the hammer back with the thumb of the right hand. The pistol thus cocked may be instantly fired by pulling the trigger with the forefinger of the same hand. After the chambers are discharged the cylinder is slipped off, and any discharged caps remaining in it are removed by passing the chambers in succession upon a fixed projecting rod beneath the barrel. They are then ready for recharging. In Warner's pistol the cartridge is introduced through an opening in the side of the stock at the rear of the chamber, and the cylinder may be removed sidewise when necessary for cleaning it, the barrel being immovably fixed to the stock. This is also the case with Allen's pistol, to supply whose chambers with cartridges the cylinder can be slipped out on one side, and when filled be returned to its place. A difficulty is encountered in increasing the size of the cartridge-loading pistols of this character. As the charges are increased the thickness of the copper cap must be proportionally increased, that the charge may not be thrown back. But if this cap is made of very thick copper the percussion powder may not be ignited by the blow of the hammer, and the charge will not then be fired. It is for this reason that these pistols are yet of diminutive sizes only, but they are nevertheless surprisingly efficient for their size, and some method will probably be devised of overcoming this obstacle to their capacity.

PISTOLE, a gold coin, equivalent in Spain to a quarter doubloon ($3.90). In Germany it is the common name of coins bearing the name of the state or sovereign who coined them, and worth about $3.70. The old Italian pistole or *doppia* is worth from $3.09 to $7.02.

PITCAIRN ISLAND, an island of the Pacific ocean, in lat. 25° 3′ S., long. 130° 8′ W.; extreme length about 2¼ m., breadth 1 m. It is elevated, the greatest height being nearly 2,500 feet above the sea, and is surrounded by cliffs which preclude the possibility of landing except in two or three spots. The temperature ranges between 59° and 90°, and the climate is remarkably healthy. There are a few small streams, but they are liable to fail at certain seasons, when the inhabitants depend upon water preserved in tanks. The soil is rich and fertile, and the island is everywhere thickly clothed with a luxuriant vegetation. Several tropical fruits and vegetables are indigenous, and many others, together with some of those belonging to temperate regions, have been successfully introduced. All the domestic animals except the horse have also been introduced, and goats are very numerous in the more inaccessible parts of the island.—Pitcairn island was discovered by Carteret in 1767, and named after one of his officers who was the first to see it. Its chief interest, however, is derived from the mutiny of the Bounty, a vessel sent by the British government to convey plants of the breadfruit tree from Tahiti to the West Indies. The Bounty arrived at Tahiti at a wrong season for transplanting, and was compelled to remain there for 6 months, during which time the crew formed connections with the natives. A few days after sailing, in April, 1789, the crew mutinied, and when they had sent Capt. Bligh and those who would not join them adrift in an open boat, they bore away for Tahiti. Here one of the crew named Christian and 8 others, after the rest had landed, induced 9 native women and 9 men to come aboard, when they put to sea and were not heard of for many years. In 1808 Capt. Folger of Nantucket, while on a sealing voyage in the Pacific, called at Pitcairn island, and, having supposed it to be uninhabited, was much surprised to see a canoe with two men of a light brownish complexion approach his vessel, and request in good English that a rope should be thrown to them. They were the descendants of the remnant of the long lost and long sought crew. Determined to cut off all traces of themselves, when the mutineers reached Pitcairn island they ran the Bounty ashore, where, after stripping her of all that might be useful to them, they burned her. Christian and his associates took the Tahitian women as wives and reduced the men to bondage. They appear to have got on well for a time, made good houses, and cultivated a considerable extent of ground; but at length the slaves rebelling, they were forced to destroy them all, not however before 8 of the masters had been killed in the affray, among whom was Christian. One of the mutineers committed suicide, and another, becoming deranged and exceedingly violent, was knocked on the head with an axe by his companions as a measure of self-defence. The rest all died natural deaths, and at the time of Capt. Folger's visit Adams was the only survivor of the mutineers. (See ADAMS, JOHN.) He drew up a simple code of laws by which the islanders are still governed, and to which they are very much attached. They are an honest, kind-hearted people, of very simple habits. When not otherwise occupied, they often hold meetings among themselves, at which the women take no inconsiderable share of the conversation. The women are more industrious than the men, and assist in the cultivation of the ground. In 1856 the whole community was removed, by some well-wishers in England and Australia, to Norfolk island; but the greater part of them were much dissatisfied with the change, and early in 1859 two families, numbering 17 souls, returned to Pitcairn island. The number remaining at Norfolk island was 202.

PITCH (Gr. πιττα), a black resinous substance constituting the residuum when the volatile portions of tar are driven off by heat. When warm it is soft and sticky, but becomes solid and brittle when cold. It is one of the products of the pine tree classed in commerce as naval stores, and is largely produced for consumption in ship building, being used to pay the seams and thus render them impervious to water. It is also used in medicine as a mild stimulant and tonic, and is administered in pills for cutaneous diseases and for piles.—Burgundy pitch is used for plasters, and when applied for some time to the skin acts as a rubefacient, exciting slight inflammation and serous effusion, and relieving chronic affections of the chest and rheumatic pains. It is prepared from the resinous matter that exudes from the Norway spruce (*abies excelsa*), and from the European silver fir tree (*A. picea*). The resin is melted in hot water, and strained through coarse cloths. This variety is yellow, and is distinguished from the compounds of common pitch, rosin, and turpentine, made to resemble it, by its peculiar odor. It is largely produced in the neighborhood of Neufchâtel, and thence furnished to commerce.—Canada pitch resembles the preceding in its properties, and is prepared from the inspissated juice of the hemlock spruce (*A. Canadensis*). The juice exudes spontaneously from old hemlock trees, and hardens upon the bark, which is stripped off, broken in pieces, and boiled in water. The pitch as it rises to the surface is skimmed off, and is purified by a second boiling. It consists of resin with a little volatile oil. It melts at 109° F., and is almost too soft at the temperature of the body to be worn as a plaster.

PITKIN, Timothy, an American historian, born in Farmington, Conn., in 1765, died in New Haven, Dec. 18, 1847. He was graduated at Yale college in 1785, studied law, became a member of the state legislature, where for 5 sessions he was speaker of the house, and from 1805 to 1819 was a representative in congress. In 1816 he published "A Statistical View of the Commerce of the United States" (2d ed., New Haven, 1835); and in 1828, "Political and Civil History of the United States from 1763 to the Close of Washington's Administration" (2 vols. 8vo., New Haven).

PITT, an E. co. of N. C., intersected by Tar river; area, about 700 sq. m.; pop. in 1860, 16,080, of whom 8,473 were slaves. It has a level surface and sandy soil. The productions in 1850 were 458,478 bushels of Indian corn, 102,352 of sweet potatoes, and 171 bales of cotton. There were 12 grist mills, 5 saw mills, 25 tar and turpentine manufactories, 18 churches, and 1,095 pupils attending public schools. Capital, Greenville.

PITT, Christopher, an English clergyman and poet, born in Blandford in 1699, died April 13, 1748. He was educated at Oxford, where he made a translation of Lucan's *Pharsalia*, which has not been preserved, and was chosen to a fellowship of New college. In 1722 he obtained the rectory of Pimperne in Dorsetshire, but he continued at Oxford until 1724, when having received the degree of M.A. he withdrew to his living, and there passed the rest of his days, greatly beloved for his benevolence. In 1727 he published a collection of his poems under the title of "A Miscellany," and two years later a translation of the first book of Virgil's Æneid, and subsequently at intervals the remaining 11 books. His version is correct, and contains many short passages of singular merit, but it has never enjoyed the same popularity as the more spirited and vigorous translation of Dryden. Pitt also made an admired translation of Vida's "Art of Poetry."

PITT, William, first earl of Chatham, an English orator and statesman, born at Westminster, Nov. 15, 1708, died at Hayes, May 11, 1778. He was the son of Robert Pitt of Boconnock in Cornwall, and grandson of Thomas Pitt, who obtained the sobriquet of Diamond Pitt from a large diamond which came into his possession in India, where he had been governor of Fort St. George at Madras, and which he sold to the regent Orleans for £135,000. William Pitt received his early education at Eton, and in 1726 entered Trinity college, Oxford, which he quitted without taking a degree, but with a high reputation for talent and for skill in elocution. He travelled in France and Italy, and on his return obtained a commission in the army as a cornet of dragoons. In 1735 he entered the house of commons for the family borough of Old Sarum. His abilities and his eloquence soon commanded attention, and made him the most formidable opponent of the ministry of Sir Robert Walpole, who in his vexation caused the "terrible cornet of horse," as he called him, to be dismissed from the service, a paltry revenge which only spurred Pitt to still fiercer attacks. "His figure when he first appeared in parliament," says Macaulay, "was strikingly graceful and commanding, his features high and noble, his eyes full of fire. His voice, even when it sank to a whisper, was heard to the remotest benches; when he strained it to its full extent, the sound rose like the swell of the organ of a great cathedral, shook the house with its peal, and was heard through lobbies and down staircases, to the court of requests and the precincts of Westminster hall. He cultivated all these eminent advantages with the most assiduous care. His action is described by a very malignant observer as equal to that of Garrick. His play of countenance was wonderful; he frequently disconcerted a hostile orator by a single glance of indignation or scorn. Every tone, from the thrilling cry to the impassioned aside, was perfectly at his command." In the debate, in 1740, on the bill for registering seamen, he was taunted by Horatio Walpole with his youth, though he was then 32 years of age, and made the celebrated reply, of which Dr. Johnson gave in the "Gentleman's Magazine" the commonly received version: "I will not attempt to determine whether youth can justly be imputed to any man as a reproach; but I will affirm that the wretch who, after having seen the consequences of repeated errors, continues still to blunder, and whose age has only added obstinacy to stupidity, is surely the object of either abhorrence or contempt, and deserves not that his gray head should secure him from insult." He gradually obtained the popular reputation of being one of the most powerful, vigilant, and patriotic opponents in parliament of unconstitutional and unwise measures. The famous duchess of Marlborough left to Pitt when she died in 1744 a legacy of £10,000, "for having defended the laws of his country and endeavored to save it from ruin." In the following year the duke of Newcastle, who had become prime minister, wished to have him made secretary of war; but the king hated Pitt, and would not consent to the appointment. In 1746 he was appointed joint vice-treasurer of Ireland and treasurer and paymaster of the army. He filled these offices with such integrity, refusing to accept the ordinary perquisites, which had made them in less scrupulous hands the most lucrative positions in the government, that his reputation rose to the highest pitch. In 1755 he determined to oppose certain measures of the ministry, and accordingly resigned his posts; but the popular discontent at his absence from office was so great that it was deemed prudent to invite him to return to the ministry with the position of secretary of state. The king however continued bitterly hostile to him, and in a short time dismissed him from office. The public indignation at this rose to such a degree that he was restored in 1757 with additional powers, which made him in fact prime minister. England was then engaged in the 7 years' war, which had opened disastrously for her arms in almost every part of the world. To Pitt was now intrusted the supreme direction of the war and of foreign affairs. Under his vigorous and skilful administration the aspect of things speedily changed. A succession of victories and conquests filled the kingdom with rejoicing, and raised still higher the already great fame of the minister. In July, 1758, Louisburg was taken, the whole island of Cape Breton was reduced, and the French fleet was destroyed. The year 1759 opened with the conquest of Goree. Next fell Guadeloupe; then Ticonderoga; then Niagara. The Toulon squadron was completely defeated by Admiral Boscawen off Cape Lagos, and this was followed by the news of the crowning triumph of Wolfe on the heights of Abraham, the surrender of Quebec, and the conquest of Canada. Next a large fleet under Conflans was completely defeated by Hawke, and a succession of English victories almost annihilated the French navy. In the mean time vast conquests had been made in India, repeated victories won over the French generals there, and a mighty empire founded in the space of three years. On the continent Pitt's measures were equally successful. When he came into power Hanover was almost completely in the hands of France; but the invaders were speedily driven out, and were beaten in 1758 at Crefeld, and in 1759 still more completely at Minden. At the same time the nation exhibited all the signs of wealth and prosperity; the merchants of London had never been more thriving, and the importance of several great commercial towns, Glasgow in particular, dates from this period. "The situation which Pitt occupied at the close of the reign of George II.," says Macaulay, "was the most enviable ever occupied by any public man in English history. He had conciliated the king; he domineered over the house of commons; he was adored by the people; he was admired by all Europe. He was the first Englishman of his times; and he had made England the first country in the world. The great commoner—the name by which he was often designated—might look down with scorn on coronets and garters." George II. died Oct. 25, 1760, and was succeeded by George III. Just at this period the French court had succeeded in obtaining the coöperation of Spain by a secret treaty known as the "family compact." Pitt, fully informed of the hostile intentions of Spain, insisted on declaring war against her before she had time for preparation. His colleagues in the ministry opposed this bold policy, and Pitt resigned Oct. 5, 1761. His wife was created Baroness Chatham in her own right, and a pension of £3,000 was settled on himself, Lady Chatham, and his eldest son. The war, however, was continued with vigor and success, and in spite of Pitt's opposition in the house of commons peace was concluded Feb. 10, 1763. He maintained his dignity and his popularity in his retirement, and came forward in parliament only when great questions were to be discussed. In 1764 he spoke against general warrants with all his customary force and eloquence, and in 1766 he opposed the American stamp act with equal vigor. In that year a new ministry was formed, and he was appointed lord privy seal, and at the same time was created a peer with the titles of Viscount Pitt and earl of Chatham. His acceptance of a peerage very much damaged his popularity. The people had been proud of him as the "great commoner," and his elevation in rank was thought to have lowered his true dignity. He did not long continue in office. In Nov. 1768, he resigned the place of lord privy seal, and never afterward held any public employment. He had been from childhood tormented by the gout, which of late years afflicted him so severely that he now seldom appeared in public, but spent much of his time in bed, employing his wife as an amanuensis in his most confidential correspondence. In the intervals of pain he sometimes appeared in the house of lords to speak on questions of great importance. In 1775, '6, and '7 he opposed with energy the measures of the ministry in the American colonies, and several of his speeches on that subject are yet popular in the United States for their lofty and impassioned eloquence. His last appearance in public was on April 2, 1778, when he went from his sick bed to the house of lords to speak against a motion to acknowledge the independence of America. He appeared swathed in flannel, crutch in hand, emaciated and debilitated, and supported by his son, and son-in-law, Lord Mahon. He protested with great animation against the dismemberment of the empire and the degradation of the power of England. The house listened in solemn silence and with profound respect. At the end of his speech he fell in an apoplectic fit, and was borne home to die a few weeks afterward.

The death of so great a statesman and orator, falling in the attempt to rouse the spirit of his countrymen, made a most profound impression on England. All parties united in doing honor to his memory, and in acknowledging his lofty genius, his unsullied probity, and his unrivalled public services. His debts were paid by the nation, his family provided for, and his body was buried in Westminster abbey. Lord Macaulay says, at the close of an article in the "Edinburgh Review:" "Chatham sleeps near the northern door of the church, in a spot which has ever since been appropriated to statesmen, as the other end of the same transept has long been to poets. Mansfield rests there, and the second William Pitt, and Fox, and Grattan, and Canning, and Wilberforce. In no other cemetery do so many great citizens lie within so narrow a space. High over these venerable graves towers the stately monument of Chatham, and from above, his own effigy, graven by a cunning hand, seems still with eagle face and outstretched arm to bid England be of good cheer and hurl defiance to her foes. The generation which reared that memorial of him has disappeared. The time has come when the rash and indiscriminate judgments which his contemporaries passed on his character may be calmly revised by history. And history, while, for the warning of vehement, high, and daring natures, she notes his many errors, will yet deliberately pronounce, that among the eminent men whose bones lie near his, scarcely one has left a more stainless, and none a more splendid name."—Of Chatham's writings, there have been published a small volume of letters to his nephew Thomas Pitt, Lord Camelford, and his "Correspondence" (4 vols., London, 1838-'40). His title expired with his eldest son (2d earl), a general officer of unenviable notoriety, in 1835. His life has been written by the Rev. Francis Thackeray (2 vols. 4to., London, 1827).

PITT, William, an English statesman, second son of the preceding, born at Hayes, county of Kent, May 28, 1759, died at Putney, Jan. 23, 1806. He was a singularly precocious child, and even at the age of 7 was remarkable for the interest which he took in grave subjects, for the ardor with which he pursued his studies, and the sense and vivacity of his remarks. At 14 he had the intellect of a man, and wrote a tragedy not worse than many productions which have been printed by persons of mature years. His physical development was not equal to his intellectual. He was tall, slender, and so sickly that he was educated at home instead of being sent like other boys of the same rank to the great public schools. Before he had completed his 15th year he was fitted to enter the university, and was sent to Pembroke hall, Cambridge, where he was first under the charge of a tutor named Pretyman, for whom he contracted a warm affection, and whom he afterward made bishop of Lincoln, a favor which his preceptor endeavored to requite by writing a life of his pupil which enjoys, according to Macaulay, the distinction of being the worst biographical work of its size in the world. At the university he was distinguished for mathematical talent and for proficiency in classical learning, but paid comparatively little attention to modern literature. Of the living languages he had no knowledge except an imperfect acquaintance with French. His favorite authors were Shakespeare, Milton, Locke, Adam Smith, and Bolingbroke. His father had trained him from infancy in the art of managing his voice, which was naturally clear and deep-toned, and his whole education had been directed to the point of making him a great parliamentary orator. On quitting the university he studied law in Lincoln's Inn, and at the age of 21, two years after his father's death, he became a member of parliament for the borough of Appleby. The party with which he acted was a section of the opposition composed of the old followers of his father, with the earl of Shelburne, Lord Camden, and Col. Barré at their head. His first speech, Feb. 26, 1781, was in favor of Burke's plan of economical reform, and made a great impression. Burke exclaimed on hearing him: "It is not a chip of the old block; it is the old block itself." Some one said to Fox: "Pitt will be one of the first men in parliament." "He is so already," answered Fox. Subsequently during the session the young orator twice addressed the house with marked success. In the next session he distinguished himself still more brilliantly, and on the rise to power of the Rockingham ministry he was offered the highly lucrative office of vice-treasurer of Ireland. Though his income at this time was very small, he declined the offer without hesitation, declaring that he would accept no post that did not give him a seat in the cabinet. Three months later, on the death of Rockingham, his successor Shelburne found that Pitt, although then but 23 years old, was the only member of his party in the house of commons who had the courage and the eloquence required to confront Fox and Burke and the other great orators of the opposition. He was accordingly brought into the cabinet as chancellor of the exchequer. In the following year the Shelburne ministry resigned, and the king, unwilling to take Fox as his successor, urgently pressed Pitt to accept the premiership. With great judgment he steadily refused the tempting offer, satisfied that he could not at that time form a stable administration. He took his seat on the opposition benches, and advocated a project of parliamentary reform which was rejected. When parliament adjourned he visited the continent in company with William Wilberforce, and was received by the Parisians in the most distinguished manner. Parliament reassembled in Nov. 1783. The ministry brought forward a bill for the government of India, which excited the fiercest opposition and was defeated in the house of lords. The ministry resigned, and Pitt succeeded as prime minister, being appointed first lord of the treasury and chancellor of the exchequer. He took office surrounded by difficulties of the most formidable kind. Among his colleagues in the house of commons there was not a single orator of note, while the opposition was led by Fox, Burke, Sheridan, and North. His policy, however, was from the outset firm and unflinching. He maintained the contest with haughty resolution from Dec. 17, 1783, to March 8, 1784, notwithstanding he was defeated in 16 divisions. Though the house of commons was hostile, the king and the people gave him the warmest support. In the midst of the struggle the clerkship of the pells, a sinecure place worth £3,000 a year for life, and one that could be held together with a seat in parliament, became vacant. Everybody thought that Pitt, whose whole private income was only £300 a year, would appoint himself; but he gave the office to Col. Barré, who was old and blind. "No minister was ever more rancorously libelled," says Macaulay; "but even when he was overwhelmed with debt, when millions were passing through his hands, when the wealthiest magnates of the realm were soliciting him for marquisates and garters, his bitterest enemies did not dare to accuse him of touching unlawful gain." The courage and determination of the young premier at length triumphed. The opposition majority was reduced to one, and parliament was dissolved with the coalition of Fox and North demoralized and practically defeated. The appeal to the country met with an enthusiastic response, 160 of the coalition members losing their seats, and Pitt being returned at the head of the poll for the university of Cambridge. He was now, at the age of 25, the greatest subject that England had seen for many generations. No minister in modern times had ever been so powerful and so popular. Macaulay terms him at this period the greatest master of the whole art of parliamentary government that has ever existed, a greater than Montague or Walpole, a greater than his father Chatham or his rival Fox, a greater than either of his illustrious successors Canning and Peel. "At his first appearance in parliament he showed himself superior to all his contemporaries in command of language. He could pour forth a long succession of round and stately periods without premeditation, without ever pausing for a word, without ever repeating a word, in a voice of silver clearness, and with a pronunciation so articulate that not a letter was slurred over. He had less amplitude of mind and less richness of imagination than Burke, less ingenuity than Windham, less wit than Sheridan, less perfect mastery of dialectical force and less of that highest sort of eloquence which consists of reason and passion fused together than Fox. Yet the almost unanimous judgment of those who were in the habit of listening to that remarkable race of men laced Pitt, as a speaker, above Burke, above Windham, above Sheridan, and not below Fox. His declamation was copious, polished, and splendid. In power of sarcasm he was probably not surpassed by any speaker, ancient or modern, and of this formidable weapon he made merciless use." On March 29, 1786, Pitt in a speech of 6 hours, delivered without notes and without a moment's hesitation, brought forward a scheme for the redemption of the national debt by means of a sinking fund, and supported it by a vast and elaborate array of figures and arguments. It was agreed to by the house without a single dissentient vote, and raised his reputation as a financier to a degree which subsequent experience has not justified. In the autumn of 1788 George III. became insane. The opposition, with whom the prince of Wales, afterward George IV., had affiliated, contended that the prince, who all agreed should be regent during the king's insanity, was as a matter of course entitled to the full powers of the crown. Pitt maintained that it belonged to parliament to determine with what degree of power the regent should be intrusted. The people, to whom the prince's vices made him odious, sided with Pitt, and supported him with enthusiasm during a long and violent contest on the subject; and when that contest was terminated by the king's unexpected recovery, the popularity of the minister was greater than ever. In the same year Pitt, who was always strongly opposed to slavery and the slave trade, carried by his eloquence and determination, against the opposition of some of his own colleagues, a bill to mitigate the horrors of the middle passage. Until the outbreak of the excesses of the French revolution his administration had been distinguished for its humane and peaceful character, for efforts at constitutional reform, and regard for freedom and order. He looked at first with approbation on the French movement for constitutional liberty, but in common with the vast majority of the English nation he was shocked and revolted by the atrocities of the revolutionists. He however labored hard to avert the war with France, but was at length forced by popular pressure and the current of events into hostilities. His military administration was feeble and unskilful. He underrated the resources and misunderstood the character of the French people, and made no adequate use of the means at his command. For a long series of years the operations of the English on land were marked only by inefficiency, blunders, and disasters; and on sea for a long while affairs went little better. Pitt had made his elder brother, the earl of Chatham, first lord of the admiralty, a post for which he was totally unfitted; and nothing was done by the navy till Earl Spencer succeeded him, under whose administration two great naval victories were won within a year. In spite of his blunders and failures in foreign expeditions, Pitt's extraordinary genius as a parliamentary leader continued to him the absolute control of the house of commons, and at length the opposition to him there substantially vanished away. In 1799 the largest minority that could be mustered on any question was only 25 votes. Most of the leaders of the opposition had given in their adhesion to the administration, and Fox, the greatest of them all, had withdrawn from the field. In his domestic policy Pitt was vigorous and severe, and effectually repressed the revolutionary spirit in the British islands by a series of high-handed measures and arbitrary enactments which rendered him exceedingly odious to the liberal part of the people. He formed great plans however for the benefit of Ireland, but could only effect the legislative union with Great Britain, his project of Catholic emancipation being defeated by the obstinate prejudices of the king. Finding the monarch immovable on this point, Pitt resigned and Addington became premier. Pitt at first made no opposition to the new ministry, and for a considerable period lived in retirement, so embarrassed in circumstances, after 20 years of absolute power, as to have had serious thoughts of returning to his profession for subsistence. But when in May, 1803, the ambitious designs of Napoleon drove England to break the peace of Amiens, he appeared in parliament and made a great speech in favor of the war. In the following year the weakness of Addington and his colleagues became so apparent that the king was forced to recall Pitt to the head of affairs. Pitt desired to form a cabinet of the first men in the kingdom without reference to past party affinities; but the prejudices of the half insane monarch against Fox were insurmountable, and as Fox's friends would not take office while he was excluded, the new government was formed chiefly of the wreck of Addington's administration, with the addition of a few personal friends of the premier, of whom Harrowby, Melville, and Canning were the most eminent. Pitt was soon beset with troubles of fearful magnitude. He was deprived by various causes of his ablest coadjutors. Harrowby fell sick, and Melville was disgraced and ejected from office for questionable pecuniary transactions. On the continent Napoleon was everywhere victorious in spite of the mighty coalitions which the skill of Pitt and the money of England formed against him. The haughty and indomitable minister grew ill with anxiety and grief. The surrender of the Austrian army at Ulm gave him a shock from which he never fully recovered, though 4 days later the glorious news of the victory of Trafalgar for a moment revived his spirits. He finally gave way on hearing of the battle of Austerlitz, after which he rapidly declined and died in a few weeks. He was honored by parliament with a public funeral, and his remains were deposited near those of his father in Westminster abbey.—See "Life of William Pitt," by Earl Stanhope (4 vols., London, 1861 *et seq.*).

PITTACAL (Gr. πίττα, pitch, and καλός, beautiful), one of the principles discovered by Reichenbach in wood tar. It is a solid compound of a deep blue color precipitated from picamar, which is the bitter oil of tar deprived of its acid by the addition of barytes water. Pittacal bears some resemblance to indigo, assumes a metallic lustre by friction, and is used to dye a fast blue upon linen and cotton with tin and aluminous mordants.

PITTACUS, one of the seven wise men of Greece, born in Mytilene in Lesbos about 652 B. C., died about 569. He was the son of Hyrradius, and is first mentioned as engaged in a conspiracy with the brothers of the poet Alcæus, by which Melanchrus, tyrant of Mytilene, was slain about 612. About this time the Athenians and Mytilenæans were engaged in a war for the possession of Sigeum in the Troad. A battle ensued, in which the latter were vanquished; but Pittacus succeeded in slaying with his own hand Phrynon, the leader of the enemy, who was an Olympic victor, and whom he overcame by entangling him in a net. For his conduct he was offered great rewards, but would take only so much land as he could throw his spear over; and this was known to a late age as "the Pittacian land." Mytilene at this time was agitated by the conflict between the democratic and aristocratic parties, the latter of which was led by Alcæus and his brother. These were at length worsted and banished; but the exiles were not inclined to submit, and kept Mytilene in a state of alarm by their efforts to return, so that the inhabitants finally chose Pittacus, who belonged to the democratic party, as a ruler with absolute power, under the title of *æsymnetes*, an office which differed from that of a tyrant in being elective. This position Pittacus held from 589 to 579. The lost poems of Alcæus abounded with bitter invectives against him, describing him as an oppressor, and ridiculing the peculiarities of his personal appearance. He enacted, among other laws, that offences committed in a state of intoxication should be visited with double penalties. He was celebrated as an elegiac poet; but only a few lines of his are extant, preserved by Diogenes Laërtius.

PITTSBURG, a city, and the capital of Allegheny co., Penn., situated at the confluence of the Allegheny and Monongahela rivers, which here form the Ohio, in lat. 40° 26' 34" N., long. 80° 2' 36" W.; pop. of the city proper in 1840, 21,115; in 1850, 46,601; in 1860, 49,216, or including the suburbs, 115,000. The densely built business portion occupies the extremity of the peninsula between the two rivers, which meet at an angle of about 35°, and the outskirts extend along the bank of each stream, having between them a cliff 300 feet high, which thrusts itself forward from the table-land in the rear. On this elevation, which is known as Grant's Hill, are the reservoirs that supply the city with pure water from the Allegheny river.—Pittsburg is styled the "smoky city" on account of the heavy clouds of smoke which constantly hang over it, produced by burning bituminous coal in all dwellings and manufacturing establishments. This is the great shipping port for coal for all parts of the Mississippi valley. The amount shipped during 1860 was 1,600,000 tons. The Monongahela river, from whose banks the coal is obtained, has been improved by slackwater dams and locks so as to render it navigable in all seasons. There are 65 companies engaged in mining, 3,500 men employed in the mines, and more than $1,000,000 invested in improvements, and $350,000 in coal tugs for towing the coal to market. The value of coal lands is from $400 to $800 per acre. From the first Pittsburg has been a manufacturing city. In articles of iron it is surpassed by no city in the Union. There are now 28 large iron and steel works in operation, which consume more than $7,000,000 worth of material annually, such as pig iron, blooms, scrap iron, coal, coke, fire clay, &c. They employ about 6,000 hands, and their annual product amounts to $12,000,000. The value of nails, spikes, and rivets alone for 1857 was $3,000,000, and blister, plough, and cast steel $2,000,000. Other articles of manufacture are axles, vices, springs, crow-bars, sheet, bar, and boiler iron, gas pipe, &c. There are 16 founderies of the yearly capacity of 45,000 tons, consuming pig iron, coal, coke, fire brick, and other materials, to the value of $700,000 annually, employing 800 hands, and producing castings to the value of $1,250,000. An immense cannon foundery is in operation, which supplies heavy ordnance for the government. The great "Union" gun, the largest in the world, cast here in Jan. 1861, weighed 49,050 lbs. There are machine shops, manufactories of boilers, shovels, ploughs, axes, safes, cutlery, files, wire, rifles, guns, and revolvers. About 350 steam engines are built here annually. Among other establishments are 2 copper smelting and rolling mills employing 300 men, 6 cotton mills employing more than 1,000 hands, 9 white lead factories, and a large number of glass factories. In 1857 there were 34 glass houses, employing more than 2,000 hands, consuming annually $2,250,000 worth of materials, and making $3,000,000 worth of glass. Steamboats are built here for all western and southern rivers, and the number of boats now (1861) owned in the city is 167, with an aggregate burden of 26,974 tons. The value of flat-boats used for carrying coal to market (where the boat is always sold) is about $250,000 per annum. The whole commercial and manufacturing product of the city in 1850 amounted to $50,000,000, in 1860 to near $100,000,000.—The most imposing public buildings are the court house and new Roman Catholic cathedral. The latter is the largest building of the kind in America except the cathedral at Montreal. Many fine shops and warehouses are built entirely of iron, which is one of the best and cheapest materials in use. There are about 115 churches in the city and suburbs. The city is connected with Alleghany City, on the opposite side of the Alleghany river, by 4 bridges, one of which is a railroad bridge, and a suspension aqueduct for canal purposes. One of the finest suspension bridges in the world was erected here in 1860. Two bridges connect the city with Birmingham and Sligo on the Monongahela side. The railroads in operation are the Pennsylvania central, the Pittsburg, Fort Wayne, and Chicago, the Cleveland and Pittsburg, the Pittsburg and Connellsville, and the Alleghany valley. The Pittsburg and Connellsville railroad is completed to Connellsville, 60 m., and is destined to extend to Cumberland, Md., on the Baltimore and Ohio railroad. The Alleghany valley railroad is intended to meet the New York and Erie railroad at Olean, and 44 m. of it are in working order. The Steubenville and Indiana railroad is partly completed W. of Steubenville, O., and is nearly ready for the iron between Pittsburg and Steubenville. The Chartiers valley railroad, connecting Pittsburg and Washington, Penn., 30 m. in length, is partially graded. There are 4 city passenger railroads, 3 of which are in active operation. The city has an excellent system of public schools, and is the seat of the western theological seminary of the Old School Presbyterian church; the western university of Pennsylvania; two commercial colleges, an insane asylum, an observatory, and a marine hospital. There are 3 public libraries containing about 6,000 volumes. There are 10 or 11 newspapers, including 2 in the German language, and the city has a well supported theatre. There is a U. S. arsenal situated here, containing a large supply of heavy ordnance. There are 6 banks of issue, with an aggregate capital of $4,300,000, and 3 banks of deposit, beside savings banks and private banking houses.—The early history of Pittsburg, or Fort Pitt, as it was formerly called, is full of interest. It was first subject to Great Britain, then to France, then reconquered by the English. The English claimed title to the territory under a charter from the crown, strengthened by a treaty with the Iroquois; the French laid claim on the ground of discovery. In Feb. 1754, the English commenced building a stockade at the river junction, but were driven from it in April by a French force under Captain Contrecœur, who proceeded at once to erect a fort, which he called Duquesne, in honor of the governor of Canada. This fort at once became the great centre of all the military operations of the French in this part of the country, and its commanding position rendered its restoration to the English a matter of the first importance. Accordingly, in 1755, Gen. Braddock, at the head of the largest expedition that had ever crossed the Alleghanies, was sent to recapture it. On July 9, 1755, he was met and defeated by the French and Indians at a point on the Monongahela 12 m. above the fort. Twelve of the British soldiers taken prisoners on that occasion were burned by the savages. A force of 800 men under Major Grant was cut to pieces in a second attempt to take the fort, Oct. 15, 1758; but a third, by 6,000 men under Gen. Forbes, Nov. 25, 1758, was successful, the French, disheartened by the failure of several attacks on the advancing army, having abandoned and set fire to it on the day preceding. A new and large fort was built and completed about Jan. 1759. It was called Fort Pitt, in honor of the British minister. Several expeditions were fitted out against it by the French, but they all failed. In 1764 the first efforts were made toward building a town. In Oct. 1772, the post was abandoned by the English. A controversy between Pennsylvania and Virginia as to the boundary line was the subject of much negotiation, and gave rise to ill feeling between the two states, Virginia claiming the territory on which the city stands under a charter from James I., and Pennsylvania under a charter from Charles II. A company of Virginians took possession of the fort under an order from the Virginia convention, Aug. 11, 1775. On Aug. 31, 1779, commissioners appointed by the two provinces met in Baltimore, and agreed upon the boundary, which was duly ratified by their respective legislatures. During the excise troubles of 1791-'4, Pittsburg was the scene of much violence. It was incorporated as a borough in 1804, and chartered as a city in 1816. In 1845 a conflagration destroyed the entire business quarter, consuming $2,000,000 worth of property.

PITTSFIELD, a town of Berkshire co., Mass., on the line of the western railroad, 151 m. W. from Boston, and 49 m. E. S. E. from Albany, and a terminus of the Housatonic and of the Pittsfield and North Adams railroads; pop. in 1855, 8,050. It is beautifully situated in an elevated valley surrounded by mountains, and is regularly laid out, with houses generally of wood and very neatly built. In 1855 there were 2 cotton mills, manufacturing 1,500,000 yards of cloth, and 6 woollen mills, producing 567,000 yards of broadcloth, and 800,000 of satinet, beside a number of other manufactories; total value of manufactured goods, $1,129,000. The Berkshire medical institution, founded in 1822, and the young ladies' institute, are both of excellent repute, and in a prosperous condition. There are 2 banks, and 9 churches, viz.: 1 Baptist, 3 Congregational, 1 Episcopal, 1 German, 2 Methodist, and 1 Roman Catholic, several of which are very handsome edifices.

PITTSYLVANIA, a S. co. of Va., bordering on N. C., bounded N. by the Staunton, intersected by the Banister through the middle, and drained by the Dan river on the S.; area, about 900 sq. m.; pop. in 1860, 32,104, of whom 14,340 were slaves. It has a diversified surface and fertile soil. The productions in 1850 were 654,015 bushels of Indian corn, 120,994 of wheat, 23,954 lbs. of wool, and 4,790,757 lbs. of tobacco. There were 25 grist mills, 18 saw mills, 7 tanneries, 8 distilleries, 43 tobacco factories, 60 churches, and 697 pupils attending public schools. Value of real estate in 1856, $4,691,571, being an increase of 62 per cent. since 1850. Capital, Competition.

PIUS, the name of 9 popes, the most celebrated of whom are the following. I. PIUS II. (See ÆNEAS SYLVIUS.) II. PIUS VI. (GIOVANNI ANGELO BRASCHI), born in Cesena in 1717, died in Valence, France, Aug. 29, 1799. Before his elevation to the pontificate he had held the office of papal treasurer. Elected to succeed Clement XIV. in 1775, he applied himself at once to the work of reform in both church and state, but met with great opposition, especially from Leopold I., grand duke of Tuscany, with whom he had a serious dispute in 1777. Soon afterward becoming involved in a disagreement with Leopold's brother, Joseph II. of Austria, who had suppressed hundreds of convents in his dominions and enacted various measures tending to withdraw the clergy of the empire from the authority of the Roman see, Pius made a journey to Vienna in 1782, but failed to effect a settlement of the points in dispute. The Jansenist synod of Pistoja in Tuscany, convened by Bishop Ricci in 1786, revived the disputes with Leopold; but on the accession of the grand duke to the imperial crown after the death of his brother (1790) a complete reconciliation was effected, both with Tuscany and Austria. In the mean time, however, the unfortunate pope had found a new enemy in France, where the property of the church was confiscated, and priests who refused to subscribe to the "civil constitution of the clergy" were put to death or banished. While condemning these violent proceedings, Pius VI. refused to join the coalition of European states against France; but an occurrence at Rome in 1793 led to still more hostile relations with the new republic. An agent of the revolutionary party named Basseville was assassinated by a mob whom he had provoked by his own imprudence, and the papal government, though it made every effort to have the murderers punished, was charged with being a party to the outrage, and threatened with summary vengeance. In 1796 Bonaparte entered Italy, took possession of the legations, and was marching upon Rome when the pope proposed a negotiation; and in Feb. 1797, a peace was signed at Tolentino, whereby the holy see agreed to surrender Avignon, Venaissin, and the legations of Ferrara, Bologna, and the Romagna; to relinquish the right of garrison in Ancona; and to give to the French 31,000,000 francs and some of the finest works of art in Rome. The fulfilment of these conditions brought the pope to the verge of ruin. After the voluntary contributions of the richest families of the city, it was still necessary to resort to an issue of paper money in order to raise the 31,000,000 francs, the payment of which the directory did not fail to urge with the utmost haste. The French stirred up revolutionary movements in Rome, and in an attempt to suppress them Gen. Duphot, an *attaché* of the French embassy, was killed by the papal troops. This gave the directory a long coveted pretext for dethroning the pontiff. On Feb. 10, 1798, Gen. Berthier entered Rome without opposition, and on the 15th declared a republic. On the 20th, having been allowed two days for preparation, the pope was escorted by a strong detachment of cavalry along the road to Florence. He lodged first at a convent near Sienna, and afterward with the Carthusians in the vicinity of Florence. In the following year the French having taken possession of Tuscany ordered him to be removed to Grenoble, where he was kept for 25 days in close confinement, with only two attendants. The victories of Suwaroff alarming the directory for the security of their captive, he was then removed to Valence and imprisoned in the citadel; and the order had been given to send him to Dijon, when he was released by death. Pius VI. was graceful in person, affable, accomplished, fond of learning and the arts, and by no means ignorant how to govern well. He undertook the drainage of the Pontine marshes, restored the Appian way and the port of Terracina, enlarged the Vatican museum, caused the publication of the splendid series of engravings known as the *Museo Pio Clementino*, adorned Rome with fountains and fine buildings, and attracted to his capital a number of learned men and artists from other parts of Europe. His administration was mild and liberal. III. Pius VII. (Barnaba Luigi Chiaramonti), born in Cesena in 1742, died Aug. 20, 1823. He entered the order of Benedictines at the age of 16, and after some years of study became lecturer on philosophy and theology to the novices at Parma and afterward at Rome. Pius VI. made him bishop of Tivoli, and in 1785 cardinal and bishop of Imola. On the death of that pontiff in exile, the conclave met at Venice, Rome being then in a state of anarchy, and after a session of several months chose Cardinal Chiaramonti pope, March 14, 1800. In the following July he entered Rome, which had previously been evacuated by the French; and in Aug. 1801, he signed a concordat with the first consul whereby Catholic worship was reëstablished in France as the state religion. In 1804 he went to Paris to crown Napoleon, passing several months there, and returning to Rome in May, 1805. The amicable relations thus apparently established were soon interrupted by the seizure by the French of the papal port of Ancona, and a demand from the emperor that his holiness should expel all Russians, Swedes, Sardinians, and Englishmen from his dominions. A long and acrimonious correspondence followed, the French meanwhile taking possession of Civita Vecchia and of all the ports on the Adriatic. The refusal of the pope to grant a divorce between Jerome Bonaparte and Miss Patterson, and a dispute concerning appointments to certain vacant sees in the kingdom of Italy, hastened the conclusion. In Feb. 1808, a French force under Gen. Miollis took possession of Rome; in April the emperor declared diplomatic intercourse at an end, and annexed the provinces of Ancona, Macerata, Fermo, and Urbino to the kingdom of Italy; and in May, 1809, the remainder of the Roman states were incorporated with the French empire, Napoleon declaring that he "deemed it proper for the security of his empire and of his people to resume the grant of Charlemagne." The pope replied to these outrages by a bull of excommunication (June, 1809). On July 6, between 2 and 3 o'clock in the morning, Gen. Radet forced an entrance into the Quirinal, and conveyed the pontiff to Grenoble, whence he was removed in 1811 to Savona. In June, 1812, he was taken to Fontainebleau. Here he was treated with great respect, and on Jan. 25, 1813, was persuaded, chiefly by the representations of several cardinals who were permitted to visit him, to sign a new concordat which tacitly gave up to the emperor the whole ecclesiastical states, and decided in favor of the civil power the long disputed question as to the papal veto on the appointment of bishops by the temporal authority. All the restrictions upon the freedom of his holiness were at once removed; but a little reflection showed Pius that he had been overreached, and on March 24, in a letter to the emperor, he retracted his concessions, expressing the humblest penitence for his weakness, and imploring the divine forgiveness. Napoleon took no notice of the letter, but after the disastrous campaign of Germany (1813) proposed to restore the provinces south of the Apennines if the pope would agree to a new concordat. Refusing to listen to any proposals until he had been restored to Rome, he was escorted to Italy in Jan. 1814; but the disturbed condition of affairs induced him to remain at Cesena until after the abdication of the emperor, when he made his entrance into Rome, May 24, 1814, in the midst of the liveliest demonstrations of popular satisfaction. For a short time during the Hundred Days he was again a fugitive, when his territories were invaded by Murat; but by the congress of Vienna all the states of the church, including the legations, were restored to him. The rest of his life was principally devoted to the domestic affairs of his dominions. He made great improvements in the police and courts of law, and through his minister Cardinal Consalvi did much toward the extirpation of banditti. He abolished every kind of torture, modified the powers of the inquisition, and confirmed the suppression of all feudal imposts, privileges, monopolies, and jurisdictions. He made new concordats with France and other states, reëstablished the society of Jesus (April 7, 1814), and condemned the carbonari. In his personal character he was modest, disinterested, and virtuous.—See Artaud de Montor, *Histoire de la vie et du pontificat du pape Pie VII.* (2 vols. 8vo., Paris, 1836), and Cardinal Pacca's "Historical Memoirs," translated into English by Sir George Head (2 vols. post 8vo., London, 1850). IV. **PIUS IX.** (GIOVANNI MARIA MASTAI FERRETTI), born in Sinigaglia, May 13, 1792. He is a son of Count Girolamo Solazzi. In his 11th year he was sent to a college at Volterra, and in 1808 went to Rome to pursue his ecclesiastical studies. During the French occupation he retired to Sinigaglia, but in 1814 returned to the capital, and in Dec. 1818 received holy orders. In 1823 he visited Chili in company with the apostolic delegate Monsignor Muzi, and passed two years at Santiago employed in preaching and instructing. Returning to Rome in Dec. 1825, he received from Leo XII. the appointment of president of the hospital of St. Michael, where he remained about a year and a half. In 1827 he was created archbishop of Spoleto. Here he founded an asylum for orphans, modelled somewhat after the plan of one over which he had presided in Rome before his mission to South America. During the disturbances of 1831 he induced 4,000 insurgents who had taken refuge in Spoleto to surrender to the papal authorities, and at the same time was intrusted *ad interim* with the civil administration of the provinces of Spoleto and Perugia. In 1832 he was transferred to the see of Imola, and in Dec. 1839 created cardinal, his appointment being reserved *in petto* until Dec. 1840. His residence at Imola was signalized by the foundation of a college for ecclesiastical students, asylums for orphans of both sexes, and a house for female penitents under the sisters of the Good Shepherd. On the death of Pope Gregory XVI. the conclave chose him pope, June 16, 1846, after a session of 48 hours, and on the next day he was proclaimed under the title of Pius IX. The election of a man of such known liberal sentiments was hailed with universal acclamation. On July 16 he published a general amnesty to political offenders, and immediately afterward applied himself with great diligence to reforming the administration, lowering the taxes, granting concessions for railroads and similar improvements, opening public offices to laymen, and stimulating manufactures and agriculture. He visited the hospitals and other public institutions in disguise, in order to detect whatever faults might exist in their management, and made his appearance in the streets on foot and without pomp. In Nov. 1847, he called together a council of state composed of delegates from the provinces. The enthusiasm excited by his liberal course extended throughout Europe and America; and in Dec. 1847, a remarkable meeting of sympathy was held by Protestant citizens in New York. The revolutions of 1848, however, soon made the Romans dissatisfied with the moderate concessions of the pope; and his unwillingness to take an active part in the Italian campaign against Austria, though he permitted a body of volunteers to march to the frontier, increased the popular discontent. He issued a proclamation, promising a constitution on a liberal basis, and summoned to the ministry the former French ambassador Count Rossi; but on Nov. 15 Rossi was assassinated at the door of the council chamber; on the next day the populace, the civic guard, the gendarmerie, the troops of the line, and the Roman legion besieged the Quirinal and forced the pope to accept a radical ministry; and on the 24th, having meanwhile remained a prisoner in his own palace, with no control over the civil administration and little or none over ecclesiastical affairs, he escaped, disguised as a simple priest, in the carriage of the Bavarian minister, Count Spaur, to Gaeta. Here he was received with great honor. The king and queen immediately sailed from Naples to meet him, and persuaded him to abandon his original purpose of accepting the hospitality of Spain. Declarations of attachment and sympathy, and presents of money, were poured upon him from all quarters of the world. He immediately issued a protest against the acts of the revolutionary government, and on Feb. 18, 1849, called upon the Catholic powers, particularly France, Spain, Austria, and Naples, for armed assistance. On the same day the Roman constituent assembly declared the inauguration of a republic and the deposition of the pope from his temporal authority. On April 25 a French force landed at Civita Vecchia and marched upon Rome, while the Austrians invaded the N. and the Spaniards the S. provinces. Rome capitulated July 1, and the government was intrusted to a papal commission, a consulta of state, a consulta for finances, and provincial councils. The pope returned to his capital in April, 1850. He declared a partial amnesty, but his progressive tendencies had been thoroughly checked, and he has since shown no disposition to rule as a constitutional monarch. Shortly after his restoration he published a brief restoring the Roman Catholic hierarchy in England, a measure which provoked a violent outburst of popular feeling, and led to an act of parliament forbidding the Catholic bishops to assume their titles. In 1854 he invited the bishops from all parts of Christendom to meet at Rome, and with their consent formally defined the doctrine of the immaculate conception to be a dogma of the Catholic faith. The ceremony took place in St. Peter's, Dec. 8. The other most important ecclesiastical acts of his pontificate have been the conclusion of concordats with Spain (1851), Baden (1854), and Austria (1855), and the foundation at Rome of English and American colleges for students of theology. At the time of the treaty of Villafranca, after the Italian war of 1859, it was proposed by the emperors of France and Austria to favor a confederation of the Italian states under the honorary presidency of the pope, but the project was soon abandoned. In the mean time a revolution had commenced in the papal territories (see PAPAL STATES), and on July 12 and Dec. 7, 1859, his holiness addressed notes to the diplomatic body, complaining of the part taken by Sardinia in these movements, and asking the assistance of foreign powers in behalf of his temporal authority. On Oct. 1 the Sardinian chargé d'affaires at Rome received his passport. On Dec. 2 the pope addressed a letter to the French emperor refusing to take part in the proposed European congress unless the emperor recognized the integrity of the Papal States as defined by the treaties of 1815. Napoleon replied by advising the surrender of the Romagna as the only possible solution of the Italian question, and the pope published, Jan. 19, 1860, an encyclical letter explaining his reasons for rejecting the emperor's advice. This was followed, March 26, by a bull of excommunication against all persons concerned in the invasion and dismemberment of his dominions, which was published with the usual formalities on the 29th. The events which have gradually stripped Pius IX. of nearly all his territory are mentioned in the article Papal States. The patrimony of St. Peter is still (May, 1861) guarded by French troops, but it is understood that Napoleon III. is willing to guarantee to the holy see no more than the city of Rome. A convention with Spain, concluded in Aug. 1859, engages Queen Isabella to send an army of occupation to the Roman states in case of the withdrawal of the French troops.

PIZARRO. I. Francisco, a Spanish adventurer and conqueror of Peru, born at Truxillo in Estremadura about 1471, assassinated at Lima, June 26, 1541. He was an illegitimate son of Gonzalo Pizarro, a colonel of infantry, and of Francisca Gonzales, a woman of humble condition in the town of Truxillo. He received little care from either of his parents, was taught neither to read nor write, and was employed in his early years as a swineherd. From this occupation he ran away and embarked with a crowd of other adventurers at Seville and sailed for the New World, which the discovery of Columbus had thrown open to Spanish ambition. In 1510 he was in Hispaniola or Hayti, and took part in an expedition to Uraba in Terra Firma, under the lead of Alonso de Ojeda, who on quitting the settlement in search of supplies left Pizarro in command of the colony. At a later period he was associated with Balboa in establishing the settlement at Darien, and was one of the first Europeans who set eyes on the Pacific ocean. After the death of Balboa he attached himself to the fortunes of Governor Pedro Arias, and was employed in several military expeditions. In 1515 he was sent with a small company across the isthmus to traffic with the natives on the shores of the Pacific; and when Panama was made the capital of the Spanish possessions in that quarter, he established himself in the neighborhood of that city on a tract of land which he cultivated by the labor of Indian slaves. After the lapse of a few years he formed an association with Hernando de Luques, a priest possessed of considerable money, and with Diego de Almagro, like himself a foundling and an adventurer who had earned the reputation of a gallant soldier, and uniting their funds, the three confederates fitted out an expedition for exploration and conquest along the southern coast. They purchased a vessel, and about the middle of Nov. 1524, Pizarro embarked at the head of 100 adventurers from Panama and sailed southward, leaving Almagro to follow in a smaller vessel as soon as it could be got ready, which he did not long after with about 70 men. Neither voyage was successful, and after running for several hundred miles down the coast of New Granada, and sustaining terrible hardships and losing a number of men in their attempts to penetrate the interior, both commanders returned to the isthmus with a moderate quantity of gold which they had obtained from the natives. They brought intelligence of the existence of the rich empire of Peru, and after a long controversy with the governor, Pedro Arias, succeeded in getting permission to make a second attempt. So many of their men had died of sickness and hardships in the first expedition, that only 160 could be mustered for the second. Their first exploit was to plunder a small village on the river San Juan, where they got considerable booty in gold, with which Almagro returned to Panama to beat up recruits, while Pizarro established himself on the coast and awaited reënforcements. Almagro returned with 80 men, but the numbers and spirit of the Peruvians were so formidable that the force of the adventurers was still deemed insufficient for the conquest, and Almagro was again despatched to Panama for reënforcements, while Pizarro with his followers continued to explore the coast. The governor of Panama refusing to grant any further assistance to the enterprise, Pizarro, after various adventures during which he obtained much knowledge of the country, sailed back to Panama, and went thence to Spain to ask for aid from the royal government, taking with him as vouchers several natives of Peru, a few llamas, and many articles of gold and silver of Peruvian manufacture. He reached Seville early in the summer of 1528. Immediately on his landing he was arrested and put in prison for debt contracted in America; but the king indignantly ordered his immediate release, and received him at court with distinguished favor; and on July 26, 1529, a *capitulacion* or commission was granted to him conveying the right of discovery and conquest in Peru, with the title and rank of governor and captain-general of the province, together with those of *adelantado* and *alguacil mayor* for life and a salary of 725,000 maravedis. He was in fact to have nearly all the authority of a viceroy. On his part he agreed within 6 months to raise and equip a force of 250 men, and to embark without delay for the conquest of Peru. With a small force partly gathered in Spain, and accompanied by 4 of his brothers, Pizarro recrossed the Atlantic in Jan. 1530, and just a year later sailed from Panama with 3 vessels, 180 men, and 27 horses on his final and successful expedition against the empire of the tions. (For an account of the conquest, see Peru.) During nearly the whole enterprise there had been much dissension between Pizarro and Almagro, the latter complaining justly that his services were not properly rewarded, and that Pizarro had appropriated to himself an undue share of the honors and emoluments of their successful undertaking. The quarrel had at length broken out into civil war, in which Almagro was captured and put to death. The contest was continued by his friends, headed by Diego Almagro, his son by an Indian woman. This faction at length formed a conspiracy to assassinate Pizarro, and on Sunday just after dinner attacked him in his palace and killed him in a desperate affray, in which three of their number fell beneath his sword. He was about 70 years old at the time of his death, and left two children by a daughter of the inca Atahualpa. His descendants, bearing the title of marquis of the conquest, are still to be found at Truxillo in Spain.—Pizarro was tall, well formed, with a not unpleasing countenance, a soldier-like bearing, and a commanding presence. Though grasping in the acquisition of money, he was liberal in its use, and not only gave largely to his friends and followers, but expended most of the vast treasures of which he plundered the Incas in public buildings and schemes of improvement. Lima and several other cities were founded by him. He had never been taught either to read or write, and to the day of his death was ignorant of both those accomplishments. Though bold in action and not easily turned from his purpose, he was so slow in coming to a decision that he had an appearance of irresolution which was foreign to his character. He had formed the habit of saying "No" to every request, in order at leisure to consider the matter and grant what was expedient. He was cruel, cunning, and perfidious, and his merits seem to have been courage, constancy, and fortitude. II. Gonzalo, one of the conquerors of Peru, youngest brother of the preceding by the same father but another mother, and also illegitimate, born at Truxillo about 1506, executed at Cuzco in 1548. He entered early on the career of a soldier, and soon distinguished himself by his skill in martial exercises, so that when he came to the new world he was esteemed the best lance in Peru. He was an excellent guerilla chief, but had neither the military nor the civil capacity of Francisco. In 1540 he was appointed governor of Quito, and organized and led an expedition across the Andes which resulted in the discovery of the head waters of the Amazon and the descent of that stream to the ocean by Orellana, one of his officers. After the assassination of his brother he raised an army and rebelled against Blasco Nuñez, the new and unpopular viceroy who had been sent from Spain. He was warmly supported by the bulk of the colonists and many of the royal soldiers, and rapidly drove the viceroy from Lima, and on Jan. 18, 1546, defeated him in a pitched battle near Quito in which Nuñez was slain on the field. This victory gave Pizarro for a while the undisputed mastery of Peru. But in the following year he was attacked by the royal forces under the direction of Pedro de la Gasca, who had been sent from Spain with full authority to suppress the rebellion. After various encounters Pizarro was deserted by some of his followers, and was defeated, taken prisoner, and beheaded. III. Hernando, elder brother of the two preceding and one of the conquerors of Peru, born about 1465, died about 1565. He was the legitimate son of Colonel Pizarro by a lady of good family, was well educated, and at an early age was taken by his father to the wars in Italy, where he served under the Great Captain Gonsalvo de Cordova. He played a distinguished part in the conquest of Peru, and in 1533 was selected by his comrades as their representative to proceed to Spain with the royal share of the booty they had collected, and to ask the king for additional grants of privileges and honors. He arrived in Spain in Jan. 1534, and met with a gracious reception from the king, who complied with all the requests of the conquerors of Peru, and made their emissary a knight of Santiago and empowered him to equip an armament at Seville and take command of it. In a short time Hernando crossed the ocean with one of the largest and best appointed fleets that had yet sailed from Spain for the new world. Soon after his arrival in Peru he was appointed governor of Cuzco, which he defended for 5 months against a great host of Indian warriors. Subsequently he became involved in hostilities with Almagro, whom he had always opposed, and was taken prisoner, but spared by his rival, who finally set him at liberty. A few months later Almagro fell into the hands of Hernando and was put to death by his order. In the following year Hernando went to Spain, carrying with him a great quantity of gold, to which he trusted to obtain favor at court and rebut the charges which had been preferred against him by Almagro's friends. He was coldly received, and, though no formal sentence was pronounced against him, was imprisoned for 20 years in the fortress of Medina del Campo, from which he was dismissed in 1560 when nearly 100 years old.

PLACENTA. See Embryology.

PLACENTIA. See Piacenza.

PLACER, a middle co. of Cal., bordering on Utah, and watered by the Bear and branches of the American river; area about 1,000 sq. m.; pop. in 1860, 13,270. Its surface is mountainous toward the E., and it contains a large extent of land suitable for agriculture, and is also very rich in gold ore, having furnished $7,000,000 in 1858. In the same year the county produced 108,000 bushels of wheat and 100,000 of barley. There were 2 grist mills and 23 saw mills, 11 of which were propelled by steam, and the aggregate product of lumber was 35,000,000 feet per annum. Capital, Auburn.

PLACOIDS, a division of cartilaginous fishes in the old system of Agassiz, including the sharks and rays, characterized by a skin covered irregularly with enamelled plates, or studded with rough osseous points sometimes furnished with little hooks, and resembling the peculiar surface of shagreen. They are among the highest of fishes, approaching reptiles, and many of them are viviparous. (See COMPARATIVE ANATOMY, FISHES, and ICHTHYOLOGY.)

PLAGIOSTOMES (Gr. πλαγιος, transverse, and στομα, mouth), a sub-order of cartilaginous fishes, including the sharks and rays, in some respects the most highly organized of their class; they correspond to the selachians of Cuvier, and to the placoids of Agassiz; they are few in number in the present creation, but with the ganoids (sturgeons, &c.) were by far the most abundant in past geological epochs, these two sub-orders being the only members of the class found below the chalk. The centre of their vertebral column is usually more or less ossified and divided into separate vertebræ, and even when it forms a continuous *chorda dorsalis* the divisions are indicated by transverse partitions; the skull is united to the spine by a joint with a conical cavity, and the former is a simple cartilaginous capsule, without sutures, having a separate cartilaginous arch which performs the office of upper jaw; the mouth is arched, very wide on the lower surface, and at some distance from the snout, which is much developed for the accommodation of the large nasal capsules; the teeth are in numerous rows, the inner coming forward to replace those worn away by use; the branchial sacs are separated, with 5 or more distinct openings on the sides or lower parts of the body; the gills consist of membranous folds or plane surfaces, without the pectinated arrangement of osseous fishes, and with a pseudobranchia; there is no swimming bladder; the scapular arch is detached from the head, and the ventrals are abdominal; on the upper surface of the head, behind the eyes, is a pair of spiracles, communicating with the pharynx; the skin is covered with hard rough grains or scattered spines; in the arterial bulb are from 2 to 5 transverse rows of semilunar valves; the intestine has a spiral valve; the optic nerves do not decussate, but are connected by a commissure, and there is no arterial plexus between the layers of the choroid coat of the eye. The secreting reproductive organs communicate with the ureters, and end in a rudimentary process in the cloaca; the claspers are present as appendages to the posterior edge of the anal fins, fissured toward the end, and communicating with a cæcal subcutaneous sac, well lubricated with mucus; the ovaries are smaller than in osseous fishes, and the ova very few; some genera are viviparous, others oviparous, and others ovo-viviparous.

PLAGUE (Gr. πληγη, a blow), an aggravated malignant fever, endemic in the East, and frequently epidemic. By the old writers the words *pestis* and *pestilentia*, the synonymes of plague, as well as the corresponding Greek word, were used in an exceedingly loose sense, and must be taken as meaning nothing more than an epidemic fever. True plague is a contagious fever characterized by an eruption of carbuncles and buboes. Formerly plague occasionally prevailed in many places of northern Europe. Previous to its last visitation in 1665, it invaded England, according to Sydenham, every 30 or 40 years. Marseilles suffered from it in 1720, Moscow in 1771 and 1772, and some points in the Neapolitan dominions as late as 1815 and 1816. The celebrated "black death," which ravaged all Europe during the 14th century, appears to have been the oriental plague. As in all severe epidemics of the disease, at its commencement many of the patients died previous to the development of the peculiar eruption; but the general occurrence of carbuncles and buboes is sufficiently authenticated. It derived its name from the gangrenous eschars formed by the carbuncles, or perhaps from the petechiæ which accompanied the disease.—A report made to the French academy (*Rapport à l'académie royale de médecine sur la peste et les quarantaines*, &c., Paris, 1846) says: "1. At present the countries where the plague still originates are in the first place Egypt, afterward Syria and the two Turkeys. It is probable, however, that the plague may be developed without importation in the regencies of Tripoli, Tunis, and in the empire of Morocco. 2. In those countries the conditions which determine and favor its development are the habitation of alluvial or marshy grounds; a hot, moist atmosphere; low, badly aired, and crowded houses; the accumulation of a great quantity of animal and vegetable matters in a state of putrefaction; a scanty and unwholesome diet; great moral and physical destitution; the negligence of the laws of public and private hygiene. 3. Sporadic plague does not seem to be transmissible. Epidemic plague is transmissible both in the localities where the plague is raging and without them. 4. It is transmitted by means of miasmata given out by the bodies of the sick; these miasmata, in close and ill ventilated places, may create centres of pestilential infection. No rigorous observation has shown the transmissibility of the plague by simple contact with the infected. New experiments are necessary to determine that it is not transmissible by the goods and wearing apparel of the infected. It results from the observations made at the lazarettos for more than a year that merchandise does not transmit the plague." The period of incubation in plague would seem in no case to be beyond 8 days. The course of the disease varies very much in different cases. Sometimes the local symptoms first show themselves, and the fever which follows is comparatively mild; at other times the patient is rapidly overwhelmed by the violence of the constitutional disorder, and dies without the appearance of carbuncles or buboes; between these extremes, and tending to one form or the other, the disease presents every grade of variety. In its milder forms small spots like flea bites first make their appearance, especially on the parts of the body exposed to the air; these enlarge, become dusky, and are covered by vesicles or phlyctenæ filled with a dark-colored fluid. The base of the spots is hard; it becomes black, forming a gangrenous eschar with a circumference of an inch or an inch and a half in diameter; these are the carbuncles. This process is attended with more or less fever, which as the eschar becomes detached gradually subsides. Often consequent upon the appearance of the carbuncles, glandular swellings form, commonly in the groins or armpits, more rarely in the neck. These buboes, as they are formed, occasionally disappear without suppuration, more generally after a time pus is formed, sometimes healthy, sometimes thin and sanious. Cases in which buboes appear are attended with a higher grade of fever and with profounder depression of the vital forces; headache, restlessness, chills, and vertigo are commonly present; the eyes are red and muddy, the tongue coated, the skin hot and dry; the pulse small, weak, and frequent; petechiæ are frequently present. The duration of the disease varies. In the commencement of severe epidemics cases have been related in which the patients have died within 24 hours; in most instances, however, it continues from one to two weeks. In severe epidemics the majority of the patients die, and when recovery takes place convalescence is tedious. Morbid anatomy hitherto has added nothing to our knowledge of the disease; the blood is found to be altered and fluid, but no appearances have been noted which can be deemed characteristic.—Of the treatment of plague we know little; like other contagious exanthems, it probably runs a prescribed course which cannot be materially shortened, and perhaps in the present state of our knowledge it would be wisest in most cases to limit our efforts to the local treatment of the carbuncles and buboes, supporting the patient's strength, and placing him under as favorable hygienic circumstances as possible.

PLAICE. See FLOUNDER.

PLAINS. Two great divisions have been recognized of those portions of the earth's surface not covered by water, viz., mountains and plains, making the latter term include hilly and undulating countries and broad tracts, at whatever elevation they might be, so that the irregularities of their surface could not be denominated mountains. The geographer Buache of the French academy introduced a distinction between plains of great elevation and those lying near the level of the sea, calling the former plateaux and the latter plains or lowlands. This distinction was adopted by Humboldt, and some have restricted the term plateaux to high lands maintaining a general level, which is more or less broken up by hills, while those of a plane surface presenting around their margins abrupt descents are called table lands. Various other names designate the different kinds of plains or those of different countries.—Deserts are sandy and rocky wastes occupying immense tracts of the low lands of the globe. They abound especially in Africa and Asia, and are much less frequent and extensive on the American continent. They occur in general in regions which the prevailing winds reach after they have swept over broad tracts of mountain lands and been deprived of the moisture they carried with them. The plains of western Peru, lying under the range of the Andes, are the principal deserts of South America, and in North America other sterile tracts of vast extent and of similar features are met with on both sides of the Rocky mountains. The great African desert (see SAHARA) extends from the W. coast of Africa to the Red sea, a distance of 2,500 m., and over a width of 1,000 m. Parts of this desert are bare ledges of rock, upon which the traveller may pass for days together without seeing anything beside the hard pavement beneath and the sky above. To these succeed oceans of sand, with which in many places are intermixed such quantities of salt that the surface is white with it as if covered with ice. Beyond the Red sea the range of desert land overspreads nearly all of the Arabian peninsula, a considerable portion of Asia Minor, and may be traced through Persia, Tartary, and the great central plateau of Asia, extending thus in one almost continuous band of varying breadth from the Atlantic ocean to the borders of China. The extent of these lands in northern Africa and southern Asia, not reckoning the oases or fertile tracts included within their limits, was estimated by Humboldt to exceed the whole area of Europe, or about 500,000 square leagues.—Nearly the whole of southern Africa is an extensive though not very elevated table land, which extends 6° or 7° N. of the equator, and terminates in the highland of Senegambia on the N. W. and on that of Abyssinia in the N. E. On the E. and W. this table land is bounded by mountain chains which divide it from the lower plains bounded by the Atlantic and Indian oceans. Southward the plateau dips to the maritime plains by successive steps composed of long narrow plains called *karroos*, which in the dry season are arid deserts, but after the setting in of the autumnal rains soon become covered with verdure and with a splendid flora. The great plains of the interior are generally grassy, with a vegetation very different from the tropical vegetation of the sea coast. North of Lake Ngami the country is a dead flat for hundreds of miles, interlaced by a labyrinth of rivers with their tributaries and numerous intercommunicating branches.—The interior of Australia, so far as it has been explored, consists chiefly of vast flats, in which the rivers become stagnant in a wilderness of gigantic reeds, and the traveller scarcely finds a knoll high enough to raise him above the waters in the season of floods. Here are found wide tracts of thick herbaceous brushwood, which afford no sustenance of any kind to those who traverse them. Long droughts, to which the country is peculiarly subject, and which last sometimes for years, dry up the rivers and lakes, and convert these plains into deserts from which sweep hot winds raising the temperature of the coast regions between lat. 25° and 35° S. to even 130° in the shade. The falling of the rains, however, speedily converts these dusty wastes into verdant pastures.—Central Asia is a region of immense mountain chains supporting table lands of great extent. The northern parts of the same continent and of Europe present over a range of more than 6,000 m. a succession of broad plains, covering the greater part of Siberia, a large part of Russia, Germany, and Holland. On this range, from the Pacific to the Atlantic, are no elevations exceeding a few hundred feet. These plains in Siberia and Russia are called steppes, and large portions of them are rich pasture lands, without trees, and much resembling the prairies of the Mississippi valley.—The American continent, North and South, is eminently a land of plains. They form full two thirds of the whole surface of the country, extending on the Atlantic side from one extremity of the continent to the other, with only occasional interruptions by mountain ranges of little extent. In South America are distinguished three great regions of plains separated from each other by low ranges of mountains, which run from the Atlantic coast toward the Andes. The northern of these regions, having an area of 260,000 sq. m., comprises the valley of the Orinoco and its tributaries, and the elevation of this great territory nowhere exceeds 800 feet above the sea level. So smooth is the surface that over hundreds of square miles the land is almost as unbroken by any unevenness as the water itself, and the rivers are so sluggish that their current is diverted in any direction by light winds. This is the region of the *llanos* (Lat. *loca plana*). In the dry season the ground is parched and barren, and clouds of fine dust and sand incessantly rising fill the air. The grasses, which in the rainy season suddenly spring up and grow to the height of 4 feet, are withered and dissipated in dust. Naked stems of the palm scattered over the plains, seen through the obscure atmosphere, appear like masts of ships at sea; and as the same forms continually present themselves to the advancing traveller, he is painfully impressed with the sense of the boundlessness and dreariness of these solitudes. But as the vegetation comes forward with the return of the rains, the plains are soon overrun by vast herds of horses and wild cattle, which then find a rich pasturage; and from the jungles of the river banks, to which they had retired during the drought, the great serpents and alligators make their appearance and overspread the plains. The only interruptions to the dead level of the surface, beside the depressions of the beds of the rivers and creeks, appear to be occasional banks of limestone or sandstone called *bancos*, standing 4 or 5 feet above the general surface, flat at the top, and several leagues in length. Slight undulations, called *mesas*, imperceptible to the eye, are indicated by the water courses which are turned by them in different directions.—The plains of the Amazon extend up the course of that river and its branches to the Andes, and include, with all the waters they enclose and some ranges of hills, an area of 2,340,000 sq. m. About one third of this vast territory is covered with dense forests, the principal portions of which have never been penetrated; and so luxuriant is the vegetation and enervating the climate, that to reclaim any considerable extent of these wilds is a task almost beyond the ability of man. From their wooded character they are termed *selvas;* but open tracts like the llanos are scattered among the forests, and numerous broad rivers occupy large areas and afford the only means of gaining access to the distant interior.—The plains of the southern portion of South America, lying beyond lat. 15° S., are termed *pampas*, from an Indian word signifying a flat. They resemble the steppes of Russia, being open grass-covered tracts of vast extent, interspersed with sterile portions of sandy and stony character. Their total extent from N. to S. is about 1,800 m., and from E. to W. from 300 to 900 m. On the N. they reach the region of tropical productions, and at the extreme S. their surface is in many places concealed beneath the never-melting ice and snow of these frozen latitudes. Across their range from the coast to the Andes three belts are recognized in their northern division, distinguished from each other by their peculiar productions. The first is strongly marked by its singular growth of tall thistles succeeded by clover. The former come forth with wonderful rapidity in the early summer, shooting up to the height of 10 or 11 feet, and sending forth a profusion of rich blossoms. So close are the stems, that even if unarmed with their prickles they would still present an impenetrable barrier. As the summer passes away this vegetation dies down, and luxuriant crops of clover spring up, and invite the return of the countless herds of cattle which were expelled by the thistles. To the west of this is a belt of plains covered with long grass, which from season to season undergoes little change except as the green of summer changes to the brown hue of winter, and this gives place to the verdure of the succeeding spring. Beyond this is a region of more elevated plains lying along the range of the Andes, and covered with low trees and shrubs, all evergreens.—The plains of North America, while no less extensive than those of the southern part of the continent, are distinguished from them by greater diversities of level, which, together with superior advantages of climate, render the country far better adapted to the necessities of man. Excepting the parts covered by the Rocky and Alleghany mountains and their spurs, all the rest are plains uninterrupted by mountain elevations. Near the mountains the surface is hilly and more or less broken; but receding from the Alleghanies westward it gradually assumes the distinctive character of plains, which are developed upon a grand scale in the boundless prairies of the north-west, and in the barren territories commonly known by the name of plains which stretch away from the prairie region in the states of Arkansas, Missouri, and Kansas to the foot of the Rocky mountains. Throughout these immense territories the differences of level are sufficient to produce a steady flow in the mighty rivers, not so rapid as to obstruct their navigation, but sufficient to insure salubrity to the country by a healthy drainage; and thus is secured a system of easy intercommunication between all sections of the country, unsurpassed in importance by any similar system in the world. In the first volume of the geological report of Iowa Prof. James Hall has presented a full account of the north-western prairies. The region they occupy is the western part of Ohio, nearly the whole of the states of Indiana, Illinois, and Iowa, the southern part of Michigan, the northern part of Missouri, and portions of Kansas and Nebraska, in which, near the meridians of 97° and 100° W., they gradually pass into the arid and desert plains. Throughout this territory a great sameness exists in the varieties of the topography, the vegetable productions, the soil, and geological features. The surface is drained by streams which commence in almost imperceptible depressions of the high prairie, and flow in beds and valleys of gradually increasing depth between vertical walls of limestone or sandstone, through the horizontal strata of which the current has in past times made its channel. What are called bottom lands lie between the rocky bluffs and the stream, and upon the Mississippi and the Missouri these attain in places a width of 6 to 8 m.; they are, however, often wanting entirely, the bluffs on each side coming close to the river banks. On the upper Mississippi the bottom lands are in general well wooded, but along the state of Missouri they spread out into open prairies. These low or wet prairies are distinguished from the high or rolling prairies, which form the general upper level of the country upon the summit of the bluffs. The elevation of these above the rivers is very variable. Near Prairie du Chien in W. Wisconsin, it is about 400 feet above the Mississippi, and the bluffs themselves present a vertical face of about ¼ of this elevation. At Cairo in S. Illinois, the upper surface is from 100 to 250 feet above the river, or 400 to 550 feet above the sea level. In the central portion of the state, near the Illinois central railroad, the average elevation is from 600 to 750 feet above the sea, and near the northern border of the state this increases to 800 or 900 feet, and some of the highest swells of the prairie are 1,000 feet high. In S. Wisconsin the more elevated portions of the prairie are about 1,100 feet above tide water. In Iowa the *plateau du coteau des prairies* of Nicollet, dividing the waters of the Mississippi from those of the Missouri, is from 1,400 to 1,600 feet above the sea. On the head waters of the Illinois and Wabash, and S. and W. of Lake Michigan, the prairies are very level and smooth, and are termed flat. Elsewhere the surface is undulating and broken by the depressions of the streams, and they are known as rolling prairies. The depressions where there are no streams are often 50 feet below the mean level, and in the bottom the soil is wet and marshy and forms "swales" or "sloughs," which render the roads almost impassable. In these places the grass grows very rank and tall, but upon the upper and drier surface the natural growth is finer and the sod dense and closely interwoven. A great variety of flowering plants are interspersed among the grasses, and during the summer the whole surface of the prairies is gaily decked with the bright colors of their blooms. The characteristic herbs, as described by Prof. Gray in a paper on the "Flora of the Northern States," published in the "American Journal of Science" (2), xxiii. p. 397 (1857), would seem to be *compositæ*, especially helianthoid *compositæ*, of many species. Among the various plants named are many recognized as cultivated ornamental garden flowers. Trees are met with upon the prairies under peculiar circumstances of moisture and soil, in scattered groups, called groves, or along the larger streams, or occasionally on low rocky ridges, which are sometimes met with. West of the Mississippi they become less frequent, and near long. 98° W. they disappear altogether. The soil of the prairies is remarkable for its finely comminuted condition. It is generally free from stones, though in some localities bowlders or fragments of rock are found upon the surface and scattered through it. In the swales and in some of the bottom lands the rich black vegetable mould is very deep, but on the upper prairies its depth is usually from one to two feet. The subsoil is almost invariably an argillaceous loam, more or less mixed in its lower portions with sand and occasional pebbles. The total thickness of clay, sand, and loam amounts in some places near the larger rivers to 200 feet; but the rock is often found in other places very near the surface; its immediate cover consists of layers 2 or 3 feet thick of angular fragments. Water is generally found in the sandy stratum 15 to 30 feet below the surface. Throughout the prairie region the underlying rocks are soft sedimentary strata, especially shales and impure limestones. Most of these on exposure disintegrate readily and crumble to soil, and the whole soil of the prairies appears to have been produced from such materials not removed far from their parent beds. To the finely comminuted condition of these materials Prof. Hall ascribes the treeless character of the prairies. Where such soils are found in other portions of the West, covering tracts of limited area even in thickly wooded districts, they are commonly without trees, and, as is the case with the prairies themselves, no evidence is found in the form of ancient trunks buried in the soil that trees ever grew in these localities.

PLANCHÉ, JAMES ROBINSON, an English dramatist, born in London, Feb. 27, 1796. In 1818 he produced successfully at Drury Lane theatre a burlesque, entitled "Amoroso, King of Little Britain." In 1826 he travelled in northern Europe, publishing on his return "Lays and Legends of the Rhine," and in 1827 visited Germany again. In 1828 he produced at Drury Lane his 55th and perhaps his best dramatic work, "Charles XII." In 1830 he was elected a member of the society of antiquaries; in 1834 wrote the "History of British Costume;" in 1838, "Regal Records;" and in 1852, "The Pursuivant of Arms, or Heraldry founded upon Truth." In March, 1854, he was appointed rouge croix pursuivant of arms. Down to 1857 he had written 200 pieces for the stage.

PLANCHE, JEAN BAPTISTE GUSTAVE, a French critic, born in Paris, Feb. 16, 1808, died Sept. 18, 1857. He was educated at the Bourbon college, and became in 1831 a contributor to the *Revue des deux mondes*. For a few months he was attached to the staff of the *Journal des débats*, and in 1836 assisted Balzac in editing the short-lived *Chronique de Paris*. His critical severity made him the dread of artists and authors, while his slovenly personal habits caused him to be styled the "Diogenes of literature." Having inherited property from his father, he went to Italy about 1841, and devoted 5 years to studying the masterpieces of Italian art. On his return home in 1846, he published the results of his observations in biographical and critical essays on the Italian masters. His various essays have been collected and published by himself, 11 volumes in all.

PLANCK, GOTTLIEB JAKOB, a German theologian, born in Nurtingen, Würtemberg, Nov. 15, 1751, died in Göttingen, Aug. 31, 1833. He was educated at Tübingen, and in 1784 became ordinary professor of theology in Göttingen. Through his instrumentality, and in particular through his essays upon the history of the church and its doctrines, he gave a decided impulse to the study of theology in that university. His principal work is the "History of the Origin, the Changes, and the Development of our Protestant System" (6 vols., Leipsic, 1781–1800); and this was continued in a work published after a long interval under the title of "History of Protestant Theology from the Concordiæ Formula to the Middle of the Eighteenth Century" (Göttingen, 1831).—**HEINRICH LUDWIG**, his son, born in Göttingen, July 19, 1785, died Sept. 23, 1831, extraordinary professor of theology at Göttingen, wrote, among other works, "New Revelation and Inspiration" (1817), and a "Short Scheme of the Philosophic Doctrines of Religion" (1821).

PLANE, a surface such that a straight line joining any two points in it will lie wholly in that surface, or such a surface as may be conceived to be generated by a straight line revolving around another straight line at right angles to it. Plane geometry treats of the nature and properties of plane figures; plane trigonometry of plane triangles, or those which lie entirely in the same plane.

PLANE, a tool used by carpenters and joiners for smoothing down the surface of wood, and also for cutting it into shape corresponding to that of the cutting edge of the plane iron. Planes of the former kind, which form only flat surfaces, are called bench planes or surfacing planes; and the latter are grooving or moulding planes. They are all formed of a solid block of hard wood, called the stock, from the upper to the lower side of which is cut a wedge-shaped hole descending forward in ordinary planes at an angle of about 45°. The plane iron, which is like a chisel in shape, is placed in this opening and temporarily secured by a wooden wedge. When properly fixed and the plane is pushed forward on a board, the edge of the iron enters to a depth equal to its projection beyond the sole of the stock, and takes up a shaving which passes up the opening through the stock and is thrown out at the top. The width of the plane iron is from 2 to 8½ inches in nearly all the bench planes, which differ from each other chiefly in the length of the stock. Short planes of 5 to 8 inches are called smoothing planes, and are used mostly for giving a smooth finish to the work. Jack planes are from 12 to 17 inches in length, and are used for the rougher work. Planes of from 2 feet to 6 feet in length are known as jointers, and serve to give straightness and accuracy to the surface. In the grooving or moulding planes the sole is grooved along its whole length to correspond with the irregular outline of the edge of the plane iron; and as each plane thus cuts only its own figure, a variety of these planes are required for the diversity of mouldings, beads, grooves, ornamental edges, &c., with which joiners give a finish to their work. One form of these planes is constructed for shaping the narrow strips of which window sashes are made, each size of sash requiring its appropriate plane. (See PLANING MACHINE.)

PLANE TREE, a tree frequently planted for shade, belonging to the natural order of *platanaceæ* or planes, exogens seemingly related to the breadfruits, with deciduous sheathing stipules, flowers in globose heads, watery juice, albuminous embryo, and minute plumule. The leaves of the planes are alternate, palmate, lobed, with sheathing deciduous stipules and petioles hollow at base concealing the young leaf buds; flowers monœcious, very small, both kinds without calyx or corolla, crowded into globular aments; stamens numerous, mixed with subclavate scales; ovaries numerous, obconic or narrowly clavate, crowded and mixed with flattened scales; style elongated, awl-shaped, with the stigma on one side and near the apex; fruit a nut 1-celled and 1-seeded; seed pendulous, embryo long, tapering, lying in the axis of very thin albumen.—The oriental plane (*platanus orientalis*, Linn.) grows to the height of 60 to 80 feet; its leaves are 5-lobed, palmate, the divisions lanceolate, sinuated, stipules nearly entire; the flowers appear in May. It is a native of the Levant, and has long been in cultivation. It is justly considered one of the noblest trees of the East, on account of its massive trunk and wide-spreading branches. The bark is smooth and of a whitish gray color, scaling off every year in large patches; the branches are crooked and zigzag at the joints; the leaves large and on long petioles, cut into 5 deep-pointed lobes; the upper surface is smooth and of a shining green, the under surface paler and somewhat downy at the angles of the veins. The flowers are so small as to require a magnifying glass to distinguish them; they grow in the form of balls, which appear before the leaves in the spring, the seeds ripening in the autumn, but remaining as balls till the succeeding spring, when they open and are dispersed by means of the bristly down which surrounds them; they are small and very light, and are in reality little nuts, structurally considered. This species is of very rapid growth and attains to great age. Its geographical distribution is wide, being found in Asia Minor and Persia, and extending as far south as Cashmere. As it ascends into the mountainous regions it degenerates into a mere shrub, as on the Caucasian range. It is seldom gregarious, and the largest specimens are found in rich soils near water. It was a favorite among the ancients, and is early mentioned in Grecian history. Among the Persians it bears the name of *chinar*, and avenues and rows of it are planted in their gardens. In parts of Asia where timber is scarce the oriental plane is much employed in carpentry, joinery, and even ship building. Its wood when dry weighs 40 lbs. 4 oz. per cubic foot; it is of a yellowish white till the tree attains considerable age, after which it becomes brown mixed with jasper-like veins, and when polished it is of much beauty.—The occidental plane (*P. occidentalis*, Linn.) is the largest, loftiest, and noblest deciduous tree in America, having a grand columnar trunk, gradually diminishing upward, which gives the base great stability. Its leaves are on stout footstalks 2 or 3 inches long, very downy and grayish green at first, but becoming smooth and purplish; when first expanded they are covered with a cottony down, which disappears and the upper surface becomes perfectly smooth, though some remains of it may be seen on the lower surface; when about to fall they turn to a pale yellow. As a shade tree none is more pleasing, especially when in vigorous foliage; its branches, shooting out in a horizontal manner, finally take a direction toward the ground; its clean and whitish gray trunk and the pendent aments are conspicuous, and its entire contour, especially if the specimen have ample room to grow, renders it at all seasons attractive. In New England this species is most commonly called the buttonwood and sycamore, the latter a name belonging to an entirely distinct tree. In Canada it is called the cotton tree. From that region its range southward is beyond the Mississippi and westward from the Atlantic to the extreme western states. Like the other species, it prefers a rich, cool, and moist soil, flourishing especially on the banks of the Ohio river and its tributaries. The buttonwood is seldom attacked by any insect, but a remarkable disease has prevailed for about 20 years past, destroying its capacity to make full and perfect foliage, in consequence of which its limbs have perished and the tree in some instances died. This epidemic seems to have been general, and to be the result of badly ripened wood occasioned by the lateness of the spring growth of the young shoots and the early coolness of the autumn. In some instances, fine old trees very much injured have nearly recovered and produced their balls after several seasons of previous failure. Something similar occurred to the species in the parks of England more than 50 years ago, but there it was attributed to a late spring frost. The buttonwood has been strongly recommended for artificial plantations in order to raise a supply of firewood, for which it is very suitable, especially when used in stoves. As timber it is not much esteemed, being very perishable when exposed to the weather, though it is sometimes sawed into joists and other lumber. The wood of the stem is of an agreeable faint red color, becoming deeper in that of the roots; this, if permanently fixed by artificial means, might afford a material for ornamental purposes.—The Californian buttonwood (*P. racemosa*, Nuttall) is a remarkably distinct species; the leaves are divided more than half way down into 5 sharp-pointed, lanceolate portions, of which the 2 lowest are the smallest; all the divisions are quite entire; 2 of them in small leaves are suppressed, thus producing a leaf of only 3 parts. The young leaves, clad in a brown, pilose tomentum, feel like a piece of stout woollen cloth. The catkins are in racemes, 3 to 5 in number, with remarkably long styles persistent on the ripe balls; and a raceme with the full-grown balls measures 9 inches. The tree laden with these long pendulous racemes, each bearing so many balls at the distance of about an inch from each other, presents a very unusual appearance. The wood is thought to be superior to that of the common species, harder, more durable, and less liable to warp. In general character the tree resembles the oriental plane more than it does the common buttonwood.—The planes are readily raised from seed and propagated by layers and by cuttings. The surest way is by seeds, which should be separated from the balls by beating or by the hand. They should then be rubbed to make them clear of the wool. They can be gathered in March and sowed in the spring broadcast, very thick, in a rich seed bed of light and carefully prepared mould. When the plants first appear they should be screened from the heat of the sun, when a year old transplanted into rows 3 feet asunder, and when 4 or 5 years old transplanted and set for shade, ornament, or fuel. Cuttings put in at autumn will root, but not readily. Layers may be made either in autumn or spring; they root well, and make strong shoots the first year, ready for removal.—Except for timber and shade, the planes are of no known utility.

PLANER TREE. See Elm.

PLANET. See Astronomy.

PLANING MACHINE, a machine for planing boards and other lumber by mechanical power. This is an old invention, and was long since brought to a state of perfection nearly limiting the more recent improvements to its adaptation to mouldings and other ornamental work. Among the earliest attempts to substitute machinery for the hand plane was that of Gen. Bentham of England, who procured a patent in 1791. This was merely an application of mechanism to drive a slightly modified hand plane. Though there was too little originality in the invention to prove successful, it was experimentally used, and by demonstrating its own defects led to the invention of a machine patented by Mr. Bramah in 1802, which was placed in the royal arsenal at Woolwich, where it did good service for many years. Bramah's machine performed its operation by the rotation of a vertical spindle, carrying at its lower extremity a horizontal wheel, the rim of which was furnished with 28 cutters or gouges, which were followed by a plane also attached to the wheel. Thus the rough surface of the board was trimmed and left perfectly smooth as it was carried by suitable mechanism from end to end, under and in contact with the cutters and plane.—Though American patents were occasionally granted for these machines from the year 1800 to 1828, but little interest was felt in the invention until the latter period, when William Woodworth of New York patented the celebrated Woodworth planing machine. In 1829 Uri Emmons was the recipient of two patents, one for cylindrical and one for circular planing machines. From this time to 1840 American inventive genius was actively engaged in this direction, and many patents were annually granted. In 1836 Thomas E. Daniels of Worcester, Mass., greatly improved the Bramah or circular machine, which brought it into general notice under the name of the Daniels planer. It is usually constructed with but two cutters, and the plane of the Bramah machine is entirely dispensed with. Though not as rapid in its operation as the Woodworth, the Daniels planer, with its recent modifications and improvements, is still preferred and generally used for cabinet and other fine work to which it is adapted. During the monopoly of the Woodworth machine by the patentee and his assigns, many attempts were made to supersede it by the use of stationary cutters which were modifications of the first invention of Bentham. These machines were built in considerable numbers, and were made to operate with tolerable effect. When in perfect order, they work well, and are much more rapid in their operation than the cylinder machines, but for ordinary practical purposes the latter are preferred. The Woodworth machine performs its operation by the use of cylindrical cutters, or cutters attached to a horizontal shaft revolving with great velocity while the board is borne along under and in contact with them, by means of two or more horizontal rollers which clamp the board on either side, the rollers being driven by mechanism communicating motion from the cylinder. Though the cylindrical machine was not originally invented by Mr. Woodworth, his claims covered such essential improvements in some of its details as to render the patented modifications invaluable, and thus gave him an almost exclusive monopoly of its use. This monopoly, though jeoparded by constant and fierce litigation, was triumphantly sustained by the courts during a term of 28 years, under his original patent of 14 years and two successive renewals of 7 years each. Numerous improvements are annually added to these machines for their more perfect adaptation to special uses, descriptions of which may be found in the patent office reports.

PLANT, an organized structure containing within itself the essentials to insure its nutrition and reproduction. A plant fully developed may be considered as consisting of a root, stem, and leaves, with their modifications, which are the organs of vegetation; and of flowers with stamens, ovary, ovule, and seeds, which are the reproductive organs. Every variety and intermediate form of these several parts may occur, so that in the lowest condition of plants both the vegetative and the reproductive may be contained in a single organ called the frond, as is the case in the algæ. Structurally considered, the leaf or the frond is the simplest visible condition; but the microscope reveals that even the frond and the leaf are made up of innumerable simpler bodies called cells, helping to nourish each other by a common fluid by which they are surrounded, and each having a growth of its own. This social system of cells, which, variously modified, compose every part of all plants, including alike the hardest woods and the softest tissues, may be traced through gradations becoming less coherent, until the frond breaks up into frustules as in the *diatomaceæ*, and consisting at last only of simple and minute globules, each having a perfectly independent existence. Of these last may be cited the snow plant (*protococcus nivalis*) of arctic and alpine regions, or the *hæmatococcus* and *glœocapsa* found upon moist rocks. Such plants as consist of a single cell have numerous species occurring in all parts of the world, and are termed unicellular.

PLANT CUTTER, a conirostral bird, the type of the sub-family *phytotominæ*, by some placed with the finches and by others with the chatterers. In the single genus *phytotoma* (Mol.) the bill is short, strong, conical, broad at the base, with arched culmen and lateral margins finely serrated; wings moderate, the quills from the 3d to the 5th equal and longest; tail moderate and even; tarsi strong, shorter than the middle toe, and covered with transverse scales; toes long and slender, hind one long, and all armed with curved claws; the intestine is short, an exception to the rule in vegetable feeders. Only a few species are described, in temperate South America, in woody and dry regions, often visiting cultivated fields; they live in pairs or in small flocks, and do considerable mischief in orchards and gardens by cutting off buds, fruits, and plants with their serrated bills, destroying, as if in mere wantonness, much more than is required for food; they also eat insects. The flight is short and low, and the notes very disagreeable, resembling the grating of the teeth of saws rubbed over each other. The best known species is the *P. rara* (Mol.) of Chili, so called from its note; it is about the size of a thrush, brown above, each feather edged with lighter; top of head rufous brown, which color prevails in the lower parts; tail rufous, with a terminal dark brown bar; wings dark brown, the primaries with a white bar, and the wing coverts edged with the same. It is shot by the inhabitants for its destructiveness. The nest is made in high trees.

PLANTAGENET, the surname of the royal family of England from Henry II. to Richard III. inclusive. It belonged originally to the house of Anjou, and by most antiquaries is derived from the story that Fulk, the first earl of that family, having committed some crime, in remorse went on a pilgrimage to Rome, where he was scourged with broom twigs (*planta genista*), and from that circumstance assumed the name. It is now borne through collateral descent by the duke of Buckingham and Chandos.

PLANTAIN (*plantago*, Linn.), a genus of herbaceous plants, usually stemless, belonging to the natural order *plantaginaceæ* or ribworts, which are monopetalous exogens, the stamens alternating with the petals, having a single style and straight inflorescence. The ribworts have flat, ribbed or taper, fleshy leaves; flowers borne in spikes, rarely solitary, usually perfect; calyx 4-parted, persistent; corolla membranous, monopetalous, hypogynous, persistent, with a 4-parted limb; stamens 4, alternating with the segments of the corolla and affixed to it; ovary composed of a single carpel, sessile without a disk, of 2 or 4 cells, which are caused by the angles of the placenta; ovules peltate or erect, solitary, twin or indefinite; style simple, capillary; stigma hispid, simple, rarely half bifid; capsule membranous, dehiscing transversely; seeds sessile. The affinities of the ribworts with other orders are very obscure and are the subject of much study. The species are widely distributed over the world, chiefly however in cool and temperate latitudes.—The common plantain (*plantago major*, Linn.), introduced from Europe, has accompanied civilized man, springing up near his habitations and around his settlements to such an extent that it has acquired among the American aborigines the name of "white man's foot." Its root is perennial, and its leaves are broad and 3 to 8 inches long; there are 5 to 7 nerves traversing each leaf from end to end, which when broken across are found to enclose an elastic thread; their surface is generally smooth, sometimes pilose; the footstalk is furrowed; the scape 12 to 16 inches long, including the flower spike, which is surrounded by a great many small, bracted, and greenish white corolled blossoms, persistent after withering; stamens 2, as long as the corolla. The green and ripe seeds are eaten by birds, and canaries are often supplied with the spikes as a variation of their usual food. The broad leaves are reputed good in allaying the pain from the bites of mosquitoes, and are in popular use for dressing blisters and other sores. The heart-leaved plantain (*P. cordata*, De Lam.) is very glabrous, with round-ovate or cordate, long-petioled leaves, the midrib branching into veins, the spike loosely flowered, bracts round-ovate, fleshy, pod with 2 to 4 seeds. It grows along rivulets from New York to Wisconsin and southward, blossoming from April to June. The seaside plantain (*P. maritima*, Linn.) has very fleshy, terete, entire leaves, or rarely few-toothed, smooth; cylindrical oblong spikes, ovate convex bracts, and oval scarious sepals; this species is remarkable for its thick succulent foliage, and for growing upon salt marshes. A slenderer variety is also known. The rib grass (*P. lanceolata*, Linn.) is mostly hairy, its leaves lanceolate acute at both ends, the scape deeply sulcate, long and slender. It is also called English plantain. It sometimes makes its appearance in abundance in mowing fields and uplands, and, though looked upon as a weed, yet is not distasteful to cattle. The pigmy plantain (*P. pusilla*, Nuttall) is from 1 to 4 inches high, minutely pubescent; leaves entire, flowers crowded or scattered, pod short ovate, 4-seeded, a little exceeding the calyx and bract. It grows on dry hills, from New York to Illinois and southward, and blossoms from April till August.—The herbage of the ribworts is slightly bitter and astringent, and they have even been reckoned febrifuges. Their seeds are covered with mucus; those of a French species (*P. arenaria*, Pers.) are largely exported to the north of Europe, and are probably used for sizing cotton cloths. The seeds of an East Indian species (*P. Ispaghula*, Roxburgh) are of a cooling nature and used medicinally; those of the fleawort (*P. psyllium*, Willd.) form with boiling water a rich mucilage, and are used for catarrh and nephritic affections; the *P. coronopus* (Willd.) is said to be a diuretic; and in Egypt soda is obtained from the ashes of *P. squarrosa.* Persoon enumerates 66 species of the plantain, and there are probably several more.—The name of plantain is also applied to a species of tropical fruit (*musa sapientium*, Linn.), a mere variety of the banana.

PLANTAIN EATER, the name of the *musophaginæ*, a sub-family of conirostral birds, inhabiting Africa, and living chiefly upon the fruit of the plantain. In all the genera the bill is strong, broad at the base, curved, with notched tip; wings short; tail long and broad; tarsi and toes strong, the outer one capable of being directed backward; this last, however, is denied by Swainson.—In the genus *musophaga* (Isert) the bill is large, with the culmen much advanced on the forehead; 4th and 5th quills the longest, and the tertials long and broad; tail rounded; orbital region naked. The violet plantain eater (*M. violacea*, Is.) is 20 inches long, of a beautiful shining purplish black; crown and quills crimson, on the last with a lilac tinge; bill bright yellow, passing into crimson at the tip, light and semi-transparent; a white stripe beneath the eye. It is found on the Gold coast.—In the genus *turacus* (Cuv.), or *corythaix* (Ill.), the bill is short and high, with the lateral margins finely serrated; wings short, the 4th to the 7th quills the longest; outer toe versatile; orbital region naked, and head with movable crest. The Senegal plantain eater (*T. purpureus*, Less.) is about 16 inches long, of a glossy purple color, with the head, neck, breast, and crest green; orbits naked and red; white stripe over the eye, and a black one beneath; it is very shy, and difficult to shoot from its frequenting the highest branches of the tallest trees; it is restricted to the W. coast of tropical Africa. The Cape plantain eater (*T. Persa*, Vieill.), of S. Africa, differs principally in the white margin of its crest; the *T. Buffoni* (Swains.) has the green crest tipped with red, and both a white and a black line under the eyes. The crimson-crested plantain eater (*T. erythrolophus*, Vieill.) has the body green, the face, ears, and chin white, the crest red, and the quills lilac; it is found in W. Africa. Several other species are described in Africa, all shy and handsome birds. —In the genus *schizorhis* (Wagler) the bill is short and much arched; the wings moderate and pointed, with the 4th to the 6th quills the longest; tail long and nearly even; tarsi short and robust. The crested plantain eater (*S. variegata*, Vieill.) is about 20 inches long; the color above is cinereous with brown spots, beneath white with brown stripes; head, throat, and breast brown; quills and tail blackish, the former with the inner half white, and the latter without spots; crest of the color of the head, extending on to the nape like a ruff, of narrow and sharp-pointed feathers; bill yellow. There are a few other species, of dull gray and brownish colors. All these birds are monogamous; they build their nests in trees, and both sexes assist in incubation.—The American sub-family *opisthocomidæ* is placed in the same family by Gray; the characters are essentially the same, except in the incapability of turning the outer toe backward. It embraces the single genus *opisthocomus* (Hoffm.), and the single species *O. cristatus* (Lath.) or the hoactzin; this is about 18 inches long, greenish above, with longitudinal white stripes on the back of the neck and shoulders; the forehead and long crest chestnut, as well as the primaries and abdomen; breast lighter, with an orange tint; secondaries and tertiaries edged with white; tail long, green tipped with light buff; bare space round eyes blue, legs red, and bill yellow. It lives in small flocks on the banks of the rivers of Brazil and Guiana, feeding chiefly on the leaves of the *arum arborescens* (Linn.), which give to the flesh a musky odor rendering it unpalatable. This singular bird was placed by Linnæus and by many later authors among the gallinaceous birds, which it resembles even in its gait; it is now ranked among the perchers.

PLANTIGRADES, a division of carnivorous mammals, so named because the whole foot, including the tarsus and metatarsus, is applied to the ground in walking. The toes are longer than in the digitigrade division, the form heavier, and the diet more vegetable; they have a greater facility for raising themselves on their hind feet, for clasping, climbing, and digging; the small extent of the lumbar region renders them less supple and agile; they are generally slow in their movements, and nocturnal in habit. The distinctions between these divisions are not entirely definite, and some animals are intermediate between the two, and therefore semi-plantigrade; these divisions may be represented respectively by the bears, the dogs and cats, and the civets and weasels. Beside the bears, the plantigrades embrace the glutton or wolverene, badger, raccoon, coati, kinkajou or potto, and the panda or wah.

PLANTING. See ARBORICULTURE.

PLAQUEMINE, a S. E. parish of La., at the extremity of the state, bordering on the gulf of Mexico, and including the delta of the Mississippi, by which it is intersected; area, about 1,000 sq. m.; pop. in 1860, 8,493, of whom 5,384 were slaves. It has a low and level surface, having in no place a greater elevation than 10 feet above the gulf, and a large portion is occupied by marshes. The productions in 1850 were 16,835 hhds. of sugar, 140,090 bushels of Indian corn, 589,130 galls. of molasses, 1,536,740 lbs. of rice, and 60 bales of cotton. There were 2 churches, and 280 pupils attending public schools. Capital, Plaquemine.

PLASSEY, BATTLE OF. See CLIVE.

PLASTER OF PARIS. See GYPSUM.

PLASTERING, the coating of walls and ceilings with a layer of cement, fine mortar, or plaster of Paris. The practice is of ancient date, and the plastering of the Romans is said to have been much better done than that in our own buildings. Specimens are still to be seen of ancient Roman plastering that is firm and solid, free from cracks, and smoothed and polished on the surface as if made of marble. The roofs of the houses in Venice are said to be covered with a durable plaster that withstands the action of the weather and of the sun, and is not injured by persons walking upon it. The outside of buildings is often covered with a coating of mortar, which is lined to imitate stone work, or is finished in what is called rough cast. The latter is done by throwing or splashing upon the mortar while it is yet soft a mixture of freshly slaked lime, water, and clean fine gravel, which is immediately brushed over and colored to give to the whole a uniform hue. Small stones, pebbles, and bits of earthenware and other materials are sometimes dashed on instead of using the sifted gravel. For inside work the plaster is in lime mortar, with an exterior finish of very fine and thin mortar "floated" over the surface of the rougher first coat, or of plaster of Paris, which gives a smoother, harder, and much handsomer finish. A mixture of plaster of Paris, white sand, and lime, is known as hard finish. The cornices and other ornamental designs upon ceilings or walls are usually moulded in plaster of Paris without sand, and imbedded in pieces one after another in the groundwork before this is dry. Other materials used for these ornaments are "Carver's compo," a mixture of whiting, resin, and glue; *papier maché* glued over with whiting and glue; *carton pierre*, gutta percha, and also marble dust; but all these are inferior to plaster of Paris. Plastering is applied directly upon walls of brick and mortar, the joints of which are left rough that it may the better adhere; or upon a surface of laths, which are flat narrow strips of wood securely nailed to the joists, rafters, or studs, parallel to each other, and so close together that but little space (usually less than ½ of an inch) is left for the mortar to get between them. That which passes through spreads and hardens in lumps, which key the rest of the coating to the laths. The first coat, termed the laying or scratch coat, is allowed to become partially dry, and is then roughened in lines with a sort of rake made of bits of laths nailed together, and may also be sprinkled with water to cause the second coat to adhere closely to it. The application of this, called setting, is a work of some nicety in order to obtain a layer of uniform thickness. The plasterer provides for this by marking off the surface with little ridges of mortar called screeds, which serve as gauges, and between these the fine and thin preparation is applied, filling them up evenly, and it is then smoothed over or floated by flat wooden tools called floats, or still better with flat pieces of cork. The surface is then ready for whitening and coloring, or a third coat of fine stuff or plaster made with very fine white lime may be first applied and floated, till it forms a perfectly smooth and hard surface; but this is rarely found necessary.

PLATA, LA. See ARGENTINE CONFEDERATION.

PLATA, RIO DE LA, or the river Plate, a large river, or rather a great estuary, draining with its numerous affluents a large part of South America, formed by the confluence of the rivers Parana and Uruguay, the former rising in the table land and the latter in the mountains of Brazil; total length of the estuary with its largest affluent, about 2,500 m.; length of the estuary alone, 185 m., the breadth gradually increasing from 23 m. at Buenos Ayres to 150 m. at its entrance into the Atlantic ocean between Punta Negra (lat. 34° 55' S., long. 55° 5' W.) and Cape San Antonio (lat. 36° 21' S., long. 56° 42' W.). The basin of the Plata is one of the three geographical divisions of the southern hemisphere, and is estimated to occupy 1,250,000 sq. m. In this great water system the river most distinguished for its length, directness, and volume is the Paraguay, which on receiving the waters of the Parana near Corrientes assumes the name of that stream. The Parana thus takes the most important part in forming the estuary of La Plata. The Uruguay, its other great branch, receives several important affluents, of which the Negro, the principal river of the Banda Oriental (formerly Uruguay), is the most considerable. The estuary of La Plata contains many sand banks; the N. coast is high and rocky, but the S. shores are low, and the country beyond is filled with immense plains. The currents of the Plata are impetuous and variable, owing to the immense body of its affluents, and the river is frequently visited by violent storms, chiefly raised by gales from the plains, which drive the water in a great volume in one direction, creating so many difficulties for navigation that the name of "sailors' hell" (*el infierno de los marineros*) has been conferred upon the estuary. The depth of the river increases toward its mouth, averaging there 10 fathoms; at Montevideo, however, it hardly exceeds 3 fathoms, and gradually lessens, so that vessels drawing more than about 16 feet of water cannot ascend above Buenos Ayres.—The mouth of the river was discovered by Juan Diaz de Solis in the early part of the 16th century, and has given its Spanish name La Plata (silver or argent) to the Argentine Confederation. After the flight of Rosas and the election of Urquiza as provisional director of that confederation of states, one of the first measures of his administration was a decree, issued Aug. 28, 1852, opening the waters of the Plata to all nations, to take effect Oct. 1, 1852. Soon afterward an expedition was fitted out by the government of the United States under Commander Thomas J. Page of the U. S. navy, who explored the tributaries of the Plata from 1853 to 1856, and published a narrative of the expedition ("La Plata: the Argentine Confederation and Paraguay," New York, 1859). Martin de Moussy, a French geographer, explored the Plata from 1842 to 1859, and published a *Description géographique et statistique de la confédération Argentine* (3 vols. 8vo., Paris, 1860).

PLATÆA, an ancient city of Bœotia, on the frontiers of Attica, at the foot of Mt. Cithæron, about 5 m. S. W. from Thebes. Although, according to the Thebans, Platæa was founded by them, it was always distinguished for its persistent opposition to their supremacy. In 519 B. C. it allied itself with Athens, and to that city it ever afterward remained faithful. A thousand of its citizens shared in the battle of Marathon (490). In 480 the city was burned by the Persians, and in 479 on its territory was fought the memorable battle of Platæa. (See GREECE.) For the victory gained on their soil, the confederate Greeks granted the Platæans 80 talents, and charged them with the duty of paying annual honors to the tombs of the fallen warriors, and of celebrating every 5 years the festival of the Eleutheria; and in return the independence and inviolability of their territory were guaranteed. In 431, the first year of the Peloponnesian war, the Thebans made an unsuccessful attempt to seize the city, and it attracted attention from the length of time it withstood a siege by the Lacedæmonians. The city, defended by 480 men, held out from 429 to the summer of 427, when want of provisions compelled a surrender, after which it was razed to the ground. Platæa was rebuilt after the peace of Antalcidas, but was again destroyed by the Thebans in 374. It was subsequently rebuilt by the Macedonians, and is spoken of in the 6th century A. D. by Hierocles as one of the cities of Bœotia. Its ruins are still to be traced.

PLATE (Sp. *plata*, silver), the name by which utensils of silver or gold for domestic purposes are designated. Articles of this character have from the remotest times and among all civilized nations been highly prized, and from their durability, intrinsic value, and the beautiful forms into which they are often wrought, have been esteemed the most precious heirlooms, and been held among the choicest family treasures through successive generations. The richest treasures of the temple of Solomon were of gold and silver plate, and such constituted the untold wealth taken by the Spanish conquerors of Peru from the ancient incas. (See GOLD, vol. viii. pp. 340, 341.) Though modern art has scarcely carried the manufacture of plate to higher perfection than that attained by skilful workmen of past centuries, it has succeeded in producing substitutes for it in what is called plated manufacture, equally useful and almost as beautiful as the genuine plate, at prices that place within reach of those of moderate means what constituted the luxuries of the rich. The consequence of this is, that the production of plate made of standard gold and silver has not kept pace with the increasing wealth and population, while at the same time the consumption of these metals in articles designed for the same purposes very far exceeds all former demands of the kind.—In the use of articles of plate, especially those of elaborate finish, it is often found extremely difficult to protect them from tarnishing, and indeed to free them from the dust that collects in the interstices of the chased work. The following treatment is recommended in the "Chemical Gazette," 184[illegible], p. 362. The articles are boiled in water containing to each quart about an ounce of finely ground bone ash, and after being dried are rubbed with dry woollen rags that have been saturated with bone ash by introducing them into the boiling mixture. The polishing is finished with wash leather. The powders employed for cleansing silver commonly contain mercury, and if freely used may in time render the metal brittle.

PLATED MANUFACTURE. For the sake of producing cheap articles, having the appearance of genuine plate, and the advantages possessed by this over the same utensils of copper or brass in a sanitary view, it has long been the practice to cover the baser metals or alloys with a thin coating of silver or gold, and in some instances of platinum. Covering them with silver is known as plating, and with gold as gilding. The latter process has been described under its own name, and the method of plating by the galvanic process, termed electro-plating, under ELECTRO-METALLURGY. Several other modes of plating are in use, and it is stated that one of them was practised by the ancient Romans. This consists in soldering thin sheets of silver upon vessels of copper or brass by means of some fusible alloy—a method which the French term *le doublé*, or lining, and carefully distinguished from the true plating, which they term *placage* and *plaqué*. By one the silver is applied to the articles heated to dull redness after they have received their shape, and by the other to the surface of the ingots of copper or brass before these are drawn down into sheets. In England the former process is known as French plating, it having been practised in France long after the invention and introduction in England of the new method. As early as 1742 this was established at Sheffield by Thomas Bolsover, who produced by means of it plated buttons and snuff boxes; and soon afterward Joseph Hancock applied it to a number of other articles, as candlesticks, tankards, teapots, &c. The art was soon introduced into Birmingham, where, as at Sheffield, it long continued to form a very extensive branch of manufacture, but which is now chiefly dependent upon the electro-plating process. The English method was introduced into France about the year 1808, and rapidly took the place of the other mode of plating. In 1839 it gave employment to about 2,000 workmen, and the value of the products was about 8,000,000 *francs*. The metal to be plated may be either very pure copper or a brass containing a very large proportion of copper. The nickel alloys of copper, though preferred for electro-plating, do not answer for the older process, it being found exceedingly difficult to protect the surface from oxidation, which prevents adherence of the silver. In this respect the red copper is altogether preferable to any other material, and its want of stiffness is made up by the greater thickness of the metal. Hence plated articles may be generally known by their weight. The copper is run into ingots in cast iron moulds, which are very carefully made and furnished with rising mouthpieces for the sprues. Into these the impurities float up, and the pressure caused by the head of metal adds to the solidity of the ingots. The size of these may be 18 or 20 inches long, 3 broad, and 1¼ thick. Their surface is very carefully smoothed by filing, so as not to leave any little cavity discoverable by a microscope, and a sheet of silver is then laid over the surfaces to be plated, equal to $\frac{1}{10}$ to $\frac{1}{12}$ of the weight of copper for each side to be thus covered. It is cut not quite so large as the copper, and when smoothed down upon this, and made perfectly clean, the two are bound together with wire, and a little borax is introduced around the edges of the silver, that by its melting and closing the opening the air may be excluded and the clean copper surface be protected from oxidation. The ingot is now placed upon the burning coke in the plating furnace, and the operator watches through a little hole in the door for the shrinkage of the silver as it draws down to unite with the copper. He then takes it out as quickly as possible, for the two metals are then just ready to run together and form an alloy. By cooling, the process is checked just as the alloy is formed at the surfaces in contact, causing at these surfaces a complete union. Being now cleaned, the ingot is rolled out into a sheet of the required thickness, and between each rolling it is annealed to preserve its toughness; and finally it is cleansed in hot dilute sulphuric acid and scoured with sand. The sheet is now ready for the processes by which it is converted into the articles for which it is destined; either to be stamped in dies, which is the method now most commonly in use, or to be raised by the hammer, or to be spun in the lathe—a process described in the account of the manufacture of platinum crucibles, near the close of the article PLATINUM. These processes, common to the treatment of malleable metals in general, will be described under the head of RAISED WORK IN METAL. The method of making plated wire and small strips of various shapes, half round, flat, fluted, &c., such as have been largely employed for bread baskets, toast racks, and other light open-work utensils, is as follows: Rods of copper 1½ inches in diameter and 18 or 20 inches long are used for a foundation. The silver in very thin sheets intended to cover them is cut out and turned up to form a tube of the same diameter, the edges being made to unite by lapping and burnishing them upon a smaller rod of copper, which is heated red-hot and supported at one end. The large copper rod is now introduced, and is long enough to project a little beyond the silver at each end. At the termination of the silver a groove is sunk around the rod, and into this the silver is worked so as to make the junction air-tight. The whole is next heated red-hot, and in this condition the metals are made to unite by rubbing the surface briskly with a steel burnisher. The rod may now be drawn through plates into wire and the other ornamental shapes. The electrotype process has, however, nearly superseded all these methods of plating.

PLATINUM (Sp. *platina*, originally a diminutive for silver), a grayish white metal resembling silver in appearance, and distinguished as the heaviest and most infusible of metals. Its chemical equivalent is 98.7; its specific gravity in native grains 16.33 to 19.4, and when purified and hammered 21.53. Pure platinum is softer than silver, but a very small portion of iridium imparts to it a considerable increase of hardness; it also renders the metal elastic and diminishes its strength. Its tenacity is little inferior to that of iron. It is remarkably ductile, so that it can be drawn out into very fine wires. Wollaston obtained one not exceeding $\frac{1}{3000}$ of an inch in diameter. It is worked under the hammer with somewhat greater difficulty than cast steel, and when pure may be welded upon itself or upon iron or steel at a white heat. It is melted by the oxyhydrogen blowpipe, as described in the article BLOWPIPE. In its chemical properties platinum is remarkable for resisting the action of the most powerful acids as well as of high temperatures. It is dissolved by nitric acid only when it is alloyed with a considerable proportion of silver. Its true solvent is *aqua regia*. The caustic alkalies attack it, as also nitre and bisulphate of potash. At a high heat it may be made to combine with sulphur, phosphorus, and arsenic. It forms alloys with nearly all the other metals. Its fusibility is increased by the presence of silica and carbon, especially when these are together, and the silica enters into combination with the metal. Crucibles made of platinum are injured and become rough and brittle by frequent heating in contact with charcoal. When platinum in solution is precipitated by an easily combustible organic substance, as by boiling with carbonate of soda and sugar, it is obtained in a finely divided state called platinum black, which may be collected on a filter and dried between tissue paper. The same substance may also be produced by decomposing sulphate of platinum by alcohol with the assistance of heat. In this form platinum possesses in a remarkable degree the property of condensing gases in large quantities. When placed in oxygen the metal soon absorbs several hundred times its bulk of this gas; and when afterward exposed to mixtures containing hydrogen it has the property of eliminating this and determining its union with the oxygen. Spongy platinum, a form of the metal obtained by heating the double chloride of ammonium and platinum, possesses the same property in less degree; and in the article ACETIC ACID, vol. i. p. 66, the process is described of producing this acid by abstracting a portion of hydrogen from alcohol by means of this agent. When a jet of hydrogen is directed upon a bit of the sponge, intense heat is produced by the rapid combination of the two gases; so that an apparatus on this principle, known as Döbereiner's lamp, is in use for suddenly producing a light. (See LAMP.)—In modern times platinum was first brought into public notice in 1735 by Ulloa, a Spanish traveller in America; but there are reasons for supposing that it was known to the Romans and worked by them, and was also employed by some of the alchemists. About the middle of the last century it was carried from South America to Europe, and several French silversmiths were among the first to apply it to useful purposes; and some time after this Wollaston devised the methods of working it which have been practised to the present time. The metal is found in a native state in grains and small lumps, and very rarely in nuggets of several pounds weight, in the sands of the gold deposits, associated with a number of other metals, which are seldom if ever found except with platinum. These are iridium, osmium, rhodium, palladium, and ruthenium. The last named is contained in the alloy of osmium and iridium found in the platinum ore, and is not found in that portion of it which is soluble in *aqua regia*. They are alloyed with the platinum, and this also frequently contains from 5 to 10 per cent. of iron; so that the proportion of the pure metal may not exceed three fourths of the whole. Berzelius found the native alloys from the Ural mountains and from Colombia, S. A., of the following composition:

Substances.	Ural mountains.		Colombia.
	Coarse grains.	Fine grains.	Fine grains.
Platinum	78.94	78.58	84.30
Rhodium	0.86	1.15	3.46
Palladium	0.28	0.30	1.06
Iridium	4.97	2.35	1.46
Osmium	1.96	0.00	1.03
Iron	11.04	12.98	5.31
Copper	0.70	5.20	0.74
Total	98.75	95.56	97.86

It appears from these results that the platinum of the Ural differs from that of Colombia by containing a much larger proportion of iron; and it may be this which gives to it the deeper gray color it possesses. The following analyses of platinum from various localities are given by MM. Deville and Debray (*Annales de chimie*, [3] lvi. 449):

Analyses.	Pt.	Irid.	Rh.	Pallad.	Gold.	Copper.	Iron.	Ir. os.	Sand.	Os. & loss.	Lead?	Total.
1	86.20	0.85	1.40	0.50	1.00	0.60	7.80	0.95	0.95	..	..	100.35
2	80.00	1.55	2.50	1.00	1.50	0.65	7.20	1.40	4.35	..	..	100.65
3	76.82	1.18	1.22	1.14	1.22	0.88	7.43	7.98	2.41	..	..	100.25
4	85.50	1.05	1.00	0.60	0.80	1.40	6.75	1.10	2.95	..	..	101.15
5	79.85	4.20	0.65	1.95	0.55	0.75	4.45	4.95	2.60	0.05	..	100.00
6	76.50	0.85	1.95	1.30	1.20	1.25	6.10	7.55	1.50	1.25	0.55	100.00
7	51.45	0.40	0.65	0.15	0.85	2.15	4.30	37.30	3.00	..	..	100.25
8	45.70	0.95	2.65	0.85	3.15	1.05	6.80	2.85	35.95	0.05	..	100.00
9	59.80	2.20	1.50	1.50	2.40	1.10	4.30	25.00	1.20	0.80	..	100.00
10	61.40	1.10	1.85	1.80	1.20	1.10	4.55	26.00	1.20	..	..	100.20
11	77.50	1.45	2.30	0.85	?	2.15	9.60	2.35	1.00	2.30	..	100.50
12	76.40	4.30	0.30	1.40	0.40	4.10	11.70	0.50	1.40	..	..	100.50

Nos. 1, 2, and 3 were from Choco (Colombia), S. A.; 4, 5, and 6 from California; 7, Oregon; 8, Spain; 9 and 10, Australia; 11 and 12, Russia.

Among the few large lumps of the metal which have been found is one brought by Humboldt from South America, and deposited in the museum at Berlin. It is about the size of a pigeon's egg, and weighs 1,088 grains. In the museum at Madrid is a lump from Condoto in South America weighing 11,641 grains. A lump was found in 1827 in the Ural near the Demidoff mines of 11.57 lbs. troy; and more recently another of 22.33 lbs. troy, which is the largest piece known, and which is preserved in the Demidoff cabinet. A few obscure crystals of the metal have been noticed, the forms of which are either cubical or octahedral. As platinum commonly occurs loose in auriferous sands, it is often uncertain from what geological formation it is derived. Boussingault states that it has been met with in place in an auriferous vein of the syenitic rocks of Antioquia in South America; others have found it in very small quantities in greenstone and diorite rocks. In the Ural mountains it is found in deposits composed of the debris of serpentine rocks, and containing much chromic iron, the source of which is in the same rocks; and it is without doubt through these that the platinum is dispersed so sparingly as not to be detected, except when it is concentrated like the gold in the lower portions of the alluvial deposits. It is not, however, limited to repositories of this character, but has also been detected in very small quantities in the hematite of the department of Charente in France; and again in Hautes-Alpes in a gray copper ore, which also contains silver, antimony, lead, zinc, and other metals. It has also been found in the silver coins of Germany, derived unquestionably from the argentiferous ores which afforded the silver; and from the slags of their metallurgic treatment it was separated in 1847 by Prof. Pettenkofer of Munich to the amount of 15 ounces.—The commercial supplies of platinum are dependent upon very uncertain sources. The metal was first obtained from the gold regions of Choco and Barbacoas in the state of Cauca and near the head of the Atrato, South America; and afterward at various localities along the western slope of the Cordilleras between lat. 2° and 6° N. From this region it was carried to Europe in the middle of the last century, but was held of little importance from the ignorance of its properties and of the methods of working it. Discoveries were still later made in Brazil, and for some years the workings were very productive, but finally ceased to afford much more of the metal. The island of St. Domingo also produced small quantities. But the whole production of the American continent has probably never exceeded 900 pounds a year. This is but little more than has been obtained from Borneo in the East Indies, the annual product of which has been from 600 to 800 lbs. In the Russian gold mines platinum had been noticed as far back as 1819 by the miners, who called it white gold; and its true character was first recognized by Prof. Lubarski at St. Petersburg in 1823. It was first worked on the eastern slopes of the Ural mountains, and was afterward discovered and worked to much greater extent on the western slopes. Much the largest portions of the product were obtained from the washings of Nijni Tagilsk; and next in importance were those of Goroblagodatsk, near Kushvinsk. From 1827 to 1834 the annual yield of all the Russian washings was from 4,000 to 6,000 lbs. troy; and up to 1851 the total production was estimated at 2,081 puds (80,942 lbs. troy), of which 1,990 puds were from the washings of Nijni Tagilsk. The metal was introduced into the Russian coinage and made into pieces of 11 and 22 rubles each; but after the year 1845 its use for this purpose ceased, and the production has since greatly fallen off. In 1855 and 1856 there were no returns from the government mines, and in 1858 they amounted to only 7 lbs. 7 oz. 8 dwt., all from the washings of Goroblagodatsk. The private mines in the same years furnished respectively 42 lbs. 0 oz., 62 lbs. 11 oz. 2 dwt., and 328 lbs. 7 oz. 9 dwt. In North America platinum has been found in minute scales and grains in the gold washings of the Chaudière river, Canada East; and associated with it were small plates of iridosmine, the native alloy of iridium and osmium. It was discovered by Dr. Genth in the lead and copper ores of Lancaster co., Penn., in traces; and Prof. C. U. Shepard reports having found in Rutherford co., N. C., a lump weighing 2,541 grains. In California it accompanies the gold ores, and is detected in the gold itself that is taken to the mints for coinage. In 1854 it was found by Mr. George Simpson in the Rocky mountains, about 150 m. from Fort Laramie; and explorations were undertaken in 1860 to determine the importance of the discovery.—The methods in use for obtaining platinum free from the substances with which it is alloyed have for the most part been based on its being first dissolved in *aqua regia*; but recently the metallurgy of platinum has been materially modified. By Wollaston's method, after the crude metal has been digested until no more is dissolved, sal ammoniac is added to the decanted liquid, which causes nearly all the platinum to separate in the state of an ammonio-chloride. This being separated, metallic iron causes the precipitation of the remainder, and this portion is then redissolved in fresh acid and precipitated with sal ammoniac. By the application of heat the ammonia and chlorine are expelled, and the platinum is obtained in porous spongy masses. These are gently rubbed to powder, and with water in a wooden mortar are triturated with a wooden pestle until thoroughly washed. The heavy metallic particles which subside are separated from the lighter portions and placed in a brass cylinder slightly flaring at the lower end for the purpose of facilitating the removal of the metal. The moisture having drained off and being absorbed by bibulous paper placed in the bottom, a closely fitting piston is introduced and powerfully pressed down. The metal is thus formed into a coherent cake of specific gravity about 10, and its appearance changes from dull gray to a metallic lustre. The cake is next subjected for about 20 minutes to the powerful heat of a wind furnace; after which it is forged by hammering with a heavy hammer upon an anvil, the blows being always directed upon the ends of the cake and not upon the sides. It is worked down with more difficulty than iron. When a large quantity, as 500 oz., is operated upon at a time, this by the action of the press is obtained in a dense block about 5 inches by 4 and 2½ inches thick. It is heated in a smith's charcoal fire, where it is so placed that the jets from two tuyeres strike together upon it. When at the welding point or almost a blue heat it receives a blow from a heavy "drop" or vertical hammer somewhat like that of a pile-driving machine. It is then reheated, and in about 20 minutes is again struck, the process being repeated continually for a week or 10 days till the mass is sufficiently consolidated for forging into bars and sheets. The latter are rolled out, and the object of their preparation in large pieces is to make pans and alembics for concentrating sulphuric acid, which it is important to have in one piece. Vessels have thus been made in France weighing in a single piece over 2,000 oz.—By one of the other methods the platinum is taken in the spongy state, obtained as above described, and amalgamated with double its weight of mercury in a porphyry mortar. The amalgam is then compressed in a cylindrical cavity in a block of wood, and the excess of mercury is forced out by the application of a screw press; and after thus remaining for several hours it is exposed for a few minutes to a white heat, either directly upon the coals or in a crucible lined with charcoal. As the mercury disappears the platinum contracts and draws itself together in a very curious manner, and is at last obtained in a solid mass. This is next forged by repeated hammerings and heatings. By the Russian process the precipitated ammonio-chloride, after being well washed and dried, is heated in a cast iron pot till the ammonia and chloride are volatilized. The platinum remains behind of a gray color, and still combined with a little iridium. Three pounds of this are ground at a time with an iron mortar and pestle, no difficulty being experienced in using iron rather than wood, though Dr. Wollaston supposed the iron might prevent the particles of platinum from welding. The metal, being reduced to a fine gray powder, is wrapped in paper to keep it together and enclosed in a thick iron ring, which is then placed upon an anvil under a screw press. It is thus solidified into a cake, and after this is heated in a charcoal fire and again compressed, by which it is rendered malleable.—The method formerly practised by the French silversmiths was not adapted to remove the foreign metals and impurities from the platinum, and consequently the articles they prepared were defective in the properties for which especially the metal is valued. Their process, which was one of consolidation chiefly, was based on the facility with which platinum may be made to combine with arsenic and form a very fusible alloy. This they cast in moulds, and then expelling the arsenic by continued high heat obtained the metal in a concentrated form and malleable condition. The latest and most approved method is to obtain an alloy of platinum and lead by melting the ore with galena in a reverberatory furnace. The substances are well mixed together, and some glass and litharge are added, the latter for the purpose of decomposing the sulphurets. When fused, the mass, protected from the oxidizing action of the air, is allowed to remain for some time undisturbed that the osmides may collect in the bottom. The scoria is then removed, and the upper portion of the alloy of lead and platinum is run off and cupelled to remove the lead. The platinum is then refined in furnaces made of solid lime and heated by a large jet of oxygen and hydrogen. By prolonged fusion in this furnace all traces of silicon and osmium may be removed. This is the process of MM. Deville and Debray of Paris, who first made it known at the meeting of the academy of sciences in Paris, June 4, 1859, when they also exhibited two ingots of the metal weighing together 25 kilogrammes (about 55 lbs.), which had been fused in the same fire and cast in an ingot mould of wrought iron; also a toothed wheel of platinum cast in sand in the usual mode of casting iron. These chemists announced that by their method platinum may be melted in any quantity, and once melted it behaves precisely like gold or silver. An account of their researchés is published in the *Annales de chimie et de physique*, Aug. 1859, and a translation of the paper is in the 1st volume of the "Chemical News." Prof. Wolcott Gibbs of New York has recently completed an elaborate investigation of platinum and its associated metals, which led him to entirely new methods of separating these metals from each other in the wet way, either for practical operations or for qualitative analysis. An account of his researches and discoveries is published in vol. xii. of the Smithsonian "Contributions to Knowledge."—Platinum has been successfully worked in New York upon a considerable scale by Dr. E. A. L. Roberts, who employs the oxyhydrogen blowpipe for melting the metal. (See Blowpipe.) His object is chiefly to convert crude platinum and scraps into plates and wire for the use of dentists. To obtain the metal soft and tough and without flaws he finds thorough melting and welding at a white heat essential. The welding is a delicate process, requiring that the platinum should be perfectly clean and be heated in a muffle until the surface is too hot to be distinctly seen. If visible the metal is too cool to be welded, and hammering upon it will have the effect of shattering the piece. The metal should be handled with tongs plated with platinum, and hammered first with a clean hammer, weighing not more than a pound, upon a clean anvil; and both hammer and anvil should be as hot as possible without drawing the temper of the steel. The metal cools very quickly, and it is with difficulty kept at the high heat required. After being welded a heavier hammer may be used for forging. Dr. Roberts, having condensed the scraps or sponge by partially melting them very compactly together into a square block of 10 to 20 ounces weight, places two of these blocks in the muffle together; and as soon as they attain the high temperature required he removes one speedily to the anvil, and gives it 3 or 4 quick sharp blows in rapid succession, and returning it to the muffle treats the other in the same way, and so alternately till both are thoroughly welded. By long hammering the metal is made tough and fibrous; but if thrown into the water while hot, it becomes crystalline and brittle. The partially melted cakes before forging are crystalline and sonorous, and break easily like spelter.—The property possessed by platinum in so eminent a degree of resisting oxidation and the action of heat, of most acids, and other elements of change, renders it well adapted for various chemical utensils, for plates and bands employed by dentists for artificial teeth, and for retorts and stills of the manufacturer of sulphuric acid. It is used in the laboratory for crucibles, capsules, spatulas, wires for various purposes, and weights for delicate balances. The crucibles are ingeniously made from a flat disk by the process called spinning. The disk, being made to revolve rapidly when attached to the end of the axis of a lathe, is pressed upon by a blunt point applied successively to different parts of its surface, till it is at last turned over into the shape required. The alloys of platinum have been little used; but the French chemists in their investigations found that the metal when combined with some of its associated metals, as iridium and rhodium, is materially improved for most of its uses. With 25 per cent. of iridium an alloy is produced which is malleable and almost completely resists the action of *aqua regia*. With smaller proportions of iridium the alloy is softer, and by varying the proportions compounds are obtained of qualities especially adapted for particular purposes. Thus retorts for the manufacture of sulphuric acid are now made in Paris, which have the strength and stiffness of rolled iron. Some of the alloys are found when cast in moulds to take the impressions with great exactness. Tin as well as arsenic greatly increases the fusibility of platinum; and consequently it is not safe to use it for soldering the latter metal. For this purpose gold is commonly employed. When the oxides of easily reduced metals, as of lead for instance, are heated in platinum crucibles, these are in danger of being ruined by the formation of a fusible alloy between the platinum and the reduced metal.—Two combinations of platinum with oxygen are known: the protoxide (PtO), and the binoxide (PtO_2). These and their compounds possess no particular interest.—The subject of platinum is treated in much detail in Gmelin's "Handbook of Chemistry."

PLATO, a Greek philosopher, born in Athens (or according to some authorities in Ægina) in 429 B. C., died in 348. His father Ariston traced his descent to Codrus, and his mother Perictione reckoned Solon among her ancestors. His original name was Aristocles, derived from his grandfather; but it was changed to Plato (Gr. πλάτυς, broad), whether from the breadth of his forehead, his shoulders, or his diction, is not determined. Owing to his subsequent renown a parentage from Apollo was attributed to him, and bees settling on his infant lips were said to have betokened the honeyed sweetness of his style. Beside the ordinary training in gymnastics, grammar, and music, he was initiated by Cratylus into the doctrines of Heraclitus, and the study of Anaxagoras gave him the results of the pre-Socratic physics. The exuberant fancy which he subsequently lavished on dialectics at first overflowed in poetical compositions, epic, lyric, and dramatic. But he burned his epics on comparing them with Homer, and when, in his 20th year, he fell under the influence of Socrates, he thenceforth devoted himself to philosophy as that essence and soul of harmony of which rhythmical numbers are but the sensuous and shadowy embodiment. He was a pupil of Socrates during the last 8 or 9 years of that great reformer's life, and became thoroughly imbued with his profound ethical spirit, and master of his searching and potent dialectics. Plato alone, of all the disciples of Socrates, seems fully to have appreciated the intellectual greatness and seized the profound scientific conceptions of his master; and hence, while others, looking at single aspects of the Socratic teaching, framed one-sided systems which rather caricatured than adequately represented it, Plato developed its germs in all their fulness and fruitfulness; and his works are not more a product of his own genius than a tribute to the memory of his master. After the death of Socrates, Plato repaired to Megara, where Euclid, a former fellow disciple, had opened a school in which he sought to engraft the Socratic ethics on the stock of Eleatic idealism. To the ideas and impulses here acquired we owe very probably that group of dialogues in which Plato seeks to establish, against the Heraclitan doctrine of absolute multiplicity and the Eleatic assumption of absolute unity, the true idea of science. From Megara he visited Cyrene, Egypt, Magna Græcia, and Sicily. Of alleged journeys to Palestine, Babylon, Persia, India, &c., there is not the slightest evidence; and even of any philosophical fruits of his sojourn in Egypt his writings indicate but the faintest trace. In the Greek cities of lower Italy, however, where Pythagoreanism had its native home and still mainly flourished, he became more thoroughly conversant with the tenets of that philosophy. Hence in part probably his fondness for mathematical physics, for mythical and allegorical imagery, and possibly for political speculation, while its fundamental doctrine of unity developing itself in multiplicity furnished an admirable solution of the conflict between the Eleatic and the Heraclitan doctrines. Plato's general mode of philosophizing was in antiquity regarded as strongly Pythagorean. After about 10 years of foreign residence and travel he returned to Athens, and opened a school in his garden near the academy, where he expounded his doctrines in conversation and formal lectures to a large number of pupils (among whom were women disguised as men), attracted by his high reputation for eloquence and wisdom. He also devoted a portion of his time to composing and revising his works. His life thus flowed on in an even tenor, broken only by two visits to Syracuse, neither of them attended by very flattering results. One was made in the vain hope of realizing through the newly crowned younger Dionysius his ideal republic. Plato never married, never mingled in public affairs, and seems to have regarded the constitution and character of his native city with disfavor and almost despair. He spent a tranquil old age, his mental faculties to the last scarcely perceptibly decayed.—The writings of Plato were favorites alike with pagan and Christian antiquity, and have come down to us in a state of unusual completeness and textual purity. The genuineness of many of the pieces which bear his name has been disputed, but in case of most of them with little approach to unanimity on the part of the assailants. A few of the smaller pieces, together with the letters, are undoubtedly spurious, but the genuineness of all the more important works there is no good reason to doubt. They are all in the form of dialogues, in nearly all Socrates being the chief speaker, and the exponent of the author's sentiments. Their composition extended over a large part of his life, and they are to be regarded, probably, rather as marking different stages of his philosophical development, than as expositions of a perfectly matured and rounded system. The methods of philosophy Plato seems to have settled with great definiteness; but in regard to the subject matter to which those methods were applicable, he to the last regarded himself as an inquirer. Numerous attempts have been made to arrange his dialogues on some clear principle of classification, either logical or chronological; but none has been entirely successful. They bear no clear internal marks of the time when they were written, and they usually admit no sharp division according to their contents. We may perhaps most satisfactorily class them according to the leading epochs in the life of Plato. Thus some of the smaller dialogues on specific ethical points, may be referred to his first or more strictly Socratic period, To his residence in Megara we may refer, doubtless, the noble tetralogy of "Theætetus," the "Sophist," the "Statesman," and "Parmenides;" and finally, to the period of his establishment in the academy, those noble compositions, "Phædrus," the "Symposium," "Gorgias," "Phædon," "Philebus," the "Republic," "Timæus," and the "Laws;" though in what order it is impossible to decide, except that we may naturally regard "Phædrus" as the earliest work of this period, while the "Laws," by unanimous consent, is among the latest. Plato is one of the most fascinating writers that ever undertook to expound the enigmas of philosophy. He spreads the charms of an exhaustless fancy over the subtlest controversies of the dialectician. He is at once poet and philosopher, with no small measure of the sweet flow of diction, the richness of invention, the exuberant imagery, the never failing vivacity, and we may add the garrulity, of Homer. One of the highest charms of his writings is their thoroughly dramatic character; they are dialogues not merely in form but in spirit. They are conducted with all the freedom and animation of a real conversation between intelligent and highly gifted men. The writer winds his way into the discussion in the most natural and easy manner, the predetermined theme being often made to hang on some casual expression; his characters are delineated with equal truthfulness and vivacity, and a thousand life-like touches interspersed throughout lend to the whole an air of perfect verisimilitude. A light, buoyant humor, irony, sarcasm, banter, now broad, now delicate, picturesque illustration, and occasionally elaborate and gorgeous fable, alternate with and relieve the stern dialectical processes with which the reader has constantly to grapple. No wonder, therefore, that through about as sharp and thorny a path of dialectics as ever was trodden, and amid a style often needlessly and provokingly obscure, the student of Plato is yet drawn onward by a resistless attraction. It is necessary to even the most rapid exposition of the philosophy of Plato to keep in view his historical position. The field of science had received as yet no formal divisions, but the several schools before Socrates had, each for itself, sought to solve the problem of universal being. Socrates discarded the whole body of these speculations as aiming at what was unattainable, and worthless if attained. He threw himself entirely on questions of political and personal morality, as those which alone had an immediate interest for man, and investigated these by that searching process of question and answer in which he sought to draw forth an exact conception of the subject, and to distinguish it from all related or unrelated ideas. His powerful interrogation went to the core of every subject, and sought to enucleate its essential and distinguishing characteristic. Thus definition and generalization were the essential elements of the Socratic method, which Plato adopted to the full and developed scientifically. But he readmitted those elements of speculation which Socrates had discarded, bringing to bear upon them his new dialectical weapons, and thus made his system the embodiment and representative of all the wisdom of his time.—Plato makes no formal division of science. He evidently, however, regards it substantially under the threefold division of dialectics, physics, and ethics or politics. Dialectics, which with Aristotle became the mere instrument of science, logic, was with Plato the science of sciences, the science of absolute being. Physics and ethics are sciences only so far as they connect themselves with dialectics. Strictly speaking therefore dialectics covers the whole field of philosophy, while speaking in a looser way it appears as one single, though far the most important branch of it. Mathematics he does not regard as a science, but a help to science, lying midway between its absolute verities and the uncertainties of opinion. Dialectics, as the science *par éminence*, deals only with the absolute and invariable. Its subject matter consists of those transcendental, spiritual essences which Plato calls forms, species (εἴδη), improperly known as ideas. It is easy to say in a general way what these forms are. They are the eternal, immutable essences, removed from the sphere of sense, and cognizable only by the reason. They pervade the sensible world, being as it were the substance of which it is the shadow, giving to it whatever of partial reality it possesses. They thus answer undoubtedly to the intuitions and general truths of modern science, and they are now more generally explained as mere abstractions, universals, the product exclusively of the mind, and having no objective reality. Earlier scholars held them to be veritable, objective existences, subtle, half spiritual, and discerned directly by the eye of the soul, as sensible objects are by the eye of the body. Much as there is in Plato which gives plausibility to the more modern view, we yet incline decidedly to the realistic doctrine of former interpreters. The ideas or forms of Plato grew out of his strong conviction of the non-reality of matter. He adopted fully, in regard to the phenomenal world, the Heraclitan doctrine of the perpetual flow of all things. Thus, denying the reality of matter, which never is, but is always becoming, he would have denied equally the possibility of forming a science by generalizations from matter. It could have been but the shadow of a shadow. The same thing is shown by the relation of Plato's doctrine to the Eleatics. The Eleatics were not idealists in the modern sense of the term. Their absolute One was not a mere abstraction, a creature of the mind, but the totality of the objective universe, as discerned by the soul or the reason, itself but a subtler species of matter. It is doubtful if there was any pure idealism in antiquity. Again, the way in which we become acquainted with the "forms" proves their objective and real character. Were they mere intuitions or generalizations, we could arrive at a knowledge of them by those processes of abstraction and generalization to which the mind is abundantly competent. But such was not the case. The soul enshrined in the body could not possibly arrive at the knowledge of them. It must have acquired that knowledge in a state anterior to the present, when, disembodied, it stood face to face with these essences kindred to itself, and communed with them as the bodily sense here holds converse with the elements of matter. Thus all learning is with Plato merely reminiscence, the knowledge which the soul had in its anterior state being called up by the action of the senses upon the phenomenal world, in whose pictured semblances the soul learns to recall the features of the divine original. And that this doctrine of preëxistence and reminiscence is no mere poetic fiction, or imaginative symbol, is shown by the severity of the process which he employs in demonstrating it, and the high practical purpose to which he applies it. In order to establish the doctrine of preëxistence he employs one of the sharpest psychological processes in his entire works. He distinguishes between ideas drawn from the sense, and those conceptions which sense never could furnish, but which exist in the mind from the very commencement of our earthly being, as standards to which our sensible perceptions are all referred, and which consequently it must have brought with it from an anterior state. And in thus establishing the existence of the soul before coming into the body, he establishes its independence of the body, and by consequence its immortality. He reasons from the past to the future, and by showing that the soul is not dependent for its existence upon the body, he shows that it is not affected by the dissolution of the body. Preëxistence, the ideas or forms, and immortality are thus all woven into one indissoluble web of argument, of which the ideas are, as everywhere in his system, the central point. We hold, therefore, to the middle age realistic views of the Platonic forms or ideas, and the attempt to reduce them to the standard of the Scotch or French metaphysics of our own day is to ignore Plato's historical position, and lose sight of the peculiar problems of Grecian speculation. Of course it is impossible but that Plato, in applying to these assumed realities his sharp dialectical methods, should be sometimes inconsistent with himself, and resolve the objective essences into the subjective conceptions for which they really stand. And as these transcendental forms are the essence of all reality, and the end of all true knowledge, it follows that the soul's residence in the body is an evil, that the phenomena of sense, interposed between the mind and these absolute existences, are constantly deceiving and alluring it from its proper element. The great business of the philosopher, therefore, is to emancipate himself as far as possible, not only from the dominion of the animal appetites, but also from the illusions of sense, and to retire into that interior world of reflection in which his mind can commune with its kindred eternal essences. The "ideas," however, are not themselves all of equal excellence; but supreme above the others are the forms of the true, the beautiful, and the good, in which triad again the last takes the highest place, and becomes, perhaps, identical with the Deity, who thus, under the Platonic conception, seems to fluctuate between a personal being and the highest and noblest of the ideas. And as the ideas are the only objects of true science, and preparation to commune with them, and especially with the good, the noblest of them all, is the great end of philosophical striving, so in the last analysis science and virtue coincide, and the ideas furnish the basis not only of all science, but of piety and morality.—Physics Plato expounds in a great measure from a Pythagorean standpoint, and his cosmogony in most of its details scarcely rose, probably, even in his own view, above the level of plausible conjecture. The world is originated and not eternal. It is framed by the Creator out of a chaotic and formless mass, after the model of an immovable and perfect archetypal world. The two are brought into union through the medium of a world-soul, placed in the world according to the relation of numbers, and constituting a harmonizing link between the Deity and the archetypal world on the one hand, and blind and formless matter on the other. As the work of a good being, the world must be as perfect as the intractable and essentially evil nature of matter admits. Hence the universe is a unity, and has the most perfect of all forms and motions, the spherical and the circular. The stars are heavenly and imperishable essences, and the earth lies, round, self-poised, and immovable, in the centre of the world. The soul, according to Plato's conception of its nature, would come into the department of physics. It consisted, according to him, of two portions, the soul proper, the intellect or reason, divine and immortal, and a sensuous or appetitive principle, material and perishable; while intermediate between them, but approaching nearer to the reason, is a third element which he calls passion, and which thus mediates between the divine and the earthly, the intellectual and the sensuous, as the soul of the world mediates between Deity and matter. The immortality of the soul Plato argues at length and with great earnestness. He argues it from the general principle that contraries spring from contraries, death from life, and consequently life from death, from the soul's preëxistence, and consequent independence of the body, from its simplicity which renders it incapable of dissolution, from its superiority to the body, from its bearing within it the principle of life, &c. He believes in future retribution, exonerates God from responsibility for sin and suffering, and sets forth in elaborate myths the blessedness of the virtuous and the punishments of the vicious, blending, however, with his teaching the Pythagorean doctrine of metempsychosis.—In ethics Plato holds to the Socratic doctrine that virtue is a science and consequently matter of instruction. Virtue is essentially one, the good, but has various forms of development. He retains the fourfold division of the virtues into wisdom, courage, temperance, and justice. The three first ally themselves to the three divisions of the soul respectively, wisdom being the proper virtue of the intellect, courage of the passionate portion, and temperance of the animal or sensuous. Justice is the principle that pervades and regulates the whole. In discussing the nature of the chief good, which the ancients made the starting point of their ethical system, Plato avoids the opposite extremes of cynicism and hedonism, that on the one hand which excludes pleasure, and that on the other which makes it identical with pleasure. True virtue always carries with it its own enjoyment, and the virtuous man, another name for the philosopher, finds his highest happiness in communion with and assimilation to the good and the divine. Politics with Plato, as with the Greeks generally, are closely allied to ethics. The state is but the individual on a larger scale; the individual but a miniature state. Hence for purposes of moral analysis Plato turns from the individual to the state, as in deciphering an inscription he would turn from smaller and more obscure to larger and more legible characters. His analysis of a state is but an enlargement of his psychological analysis. Its division is threefold. The governing class represent the intellect, the essence of the soul, the laborers and handicraftsmen its sensuous and appetitive portions, and the soldiers or guards the intermediate passionate element. The virtue of the first class is wisdom, of the second temperance, and of the third courage; while in the state, as in the individual, justice is the principle that runs through, regulates, and harmonizes the whole. According to the ordinary Greek conception Plato makes the state supreme, and merges in it all the interests of individual and domestic life. Household relations and ties are to be unsparingly sacrificed on the altar of the state. A community of wives and of goods is to take the place of private property and of domestic life. The education and the employments of the citizens are all to be regulated by the state. Plato draws out at length his system of education. He would banish all dramatic poetry as involving the personating of fictitious characters, and thus virtually sanctioning falsehood, all music except the simpler and more manly kinds, all those fables which exhibit degrading pictures of the gods, and every thing that can foster timidity and the fear of death. The governing class in the state should consist of philosophers, of those who, having risen to the contemplation of the real and the true, can estimate at their worth the shadowy pursuits and pleasures of the multitude. A monarchy is to be preferred on account of the difficulty of finding many men qualified to rule. In the "Laws," however, Plato abandons the monarchical theory for that of a mixed government. His views are decidedly aristocratic, and he would devolve all the privileges of the government on the two higher classes, while the multitude are merely to be kept under wholesome restraint. Slavery Plato would tolerate, but only the enslaving of barbarians, not that of Greeks by Greeks.—A tendency to a trinity of doctrines runs through the philosophy of Plato. In psychology we have the trinity of reason, passion, and appetite; in ethics, of wisdom, courage, and temperance; in ontology, of being, becoming, and not being; in knowledge, of science, opinion, and sensation; in cosmogony, of God, the soul of the world, ideas, and matter; in the state, of magistrates, warriors, and laborers. The list might be prolonged still further. We remark finally, in general, that Plato, of all authors, is the one to whom the least justice can be done by any formal analysis. In the spirit which pervades his writings, in their untiring freshness, in their purity, love of truth and of virtue, their perpetual aspiring to the loftiest height of knowledge and of excellence, much more than in their positive doctrines, lies the secret of their charm and of their unfailing power. Plato is often styled an idealist. But this is true of the spirit rather than of the form of his doctrine; for strictly he is an intense realist, and he differs from his great pupil, Aristotle, far less in his mere philosophical method than in his lofty moral and religious aspirations, which were perpetually winging his spirit toward the beautiful and the good. His formal errors are abundant. They grow out of the materials on which he had to work, and the vastness and insolubleness of the problems with which he grappled. But even in his errors, the truth is often deeper than the error; and when this has been discredited, the language adjusts itself to the deeper truth of which it was rather an inadequate expression than a direct contradiction. The large and generous spirit of Platonism is a mould in which the noblest philosophies of earth may be cast.—Among the translations of Plato, the most distinguished is the Latin version of Marsilius Ficinus, in which the printed works of Plato were first given to the world (Florence, 1483). A German translation by Schleiermacher, never completed, is admirable, as far as it goes, for spirit and fidelity, and is accompanied by learned introductions which have been translated into English. Victor Cousin has published a translation into French. There is no good complete translation of Plato in English. Thomas Taylor, the translator of his works, understood neither Greek nor English. The much better versions of Floyer Sydenham embraced but a few pieces, and that recently published in Bohn's "Classical Library," by different hands, is not creditable to English scholarship. The editions of entire or of separate works of Plato are almost numberless. The first edition was published by Aldus (Venice, 1513), and another by H. Stephens (3 vols., 1578), reprinted in the Bipont edition with the Latin version of Marsilius Ficinus (11 vols. 8vo., 1781–'6). The text was first brought into a satisfactory condition by Bekker (Berlin, 1816–'18), reprinted by Priestley (11 vols., London, 1826), and was still further corrected by Ast (9 vols., Leipsic, 1819–'27). Perhaps the best edition is that of Stallbaum, in Jakob and Rost's *Bibliotheca Græca*, begun in 1827 and not yet completed.

PLATOFF, Matvei Ivanovitch, a Russian general, born among the Cossacks of the Don, Aug. 6, 1757, died at Elantchik, on the Don, Jan. 3, 1818. He was descended from an ancient family, and entered the army at a very early age. His first campaign was against the Turks in 1770 and 1771, and he was made hetman of the Cossacks of the Don by the emperor Alexander I. in 1801. He held the rank of lieutenant-general in the Russian army sent to assist Prussia against the French, serving in the campaigns of 1806 and 1807. Upon the conclusion of the peace of Tilsit, he was employed against the Turks in Moldavia, and was made a general of cavalry in 1809. He became celebrated chiefly through his services against the French upon their invasion of Russia in 1812. Though defeated at Grodno, and compelled to retire into the interior, he returned upon the abandonment of Moscow, and with 20 regiments of Cossacks harassed terribly the French retreat. He was active in every one of the many battles to which the French were forced, both in Russia and Germany, and especially upon their retreat from the battle of Leipsic. In 1814 he entered Paris with the allies. In 1815 he again commanded the Cossacks destined to invade France, and was raised to the dignity of count. At the peace he retired to his home on the Don.

PLATTE or Nebraska River. See Nebraska.

PLATTE, a N.W. co. of Mo., separated from Kansas by the Missouri river, which bounds it on the S. and S. W., and intersected by the Little Platte river; area, 410 sq. m.; pop. in 1860, 18,341, of whom 3,313 were slaves. It has a diversified surface and fertile soil. The productions in 1850 were 1,814,287 bushels of Indian corn, 129,067 of wheat, 127,892 of oats, 4,255 tons of hemp, 3,551 of hay, 59,760 lbs. of wool, and 250,311 of butter. There were 10 grist mills, 18 saw mills, 2 tanneries, 2 newspaper offices, 15 churches, and 1,784 pupils attending public schools. Capital, Platte City.

PLATTSBURG, a township and village, and capital of Clinton co., N. Y., on Cumberland bay, an indentation of Lake Champlain, at the mouth of the Saranac river, on both sides of which the village is built; pop. in 1860, 6,680. The river affords valuable water power, and there are several manufactories. Extensive barracks, about 1 m. from the village, formerly occupied by government troops, are now used for the annual agricultural fairs. The township contains, beside the county buildings, a town hall, custom house, academy, and 9 churches, viz.: 1 Baptist, 1 Episcopal, 1 Methodist (Wesleyan), 1 Methodist Episcopal, 1 Presbyterian, 3 Roman Catholic, and 1 Union.—On Sept. 11, 1814, the Americans gained a memorable naval victory over the English near this place. (See Champlain, Lake.)

PLAUTUS, Titus Maccius, a Roman dramatist, born at Sarsina in Umbria about 254 B. C., died in 184. The little we know of his life is derived from a passage in Aulus Gellius, quoted from Varro. He came to Rome when young, and went into the service of the actors, and having made sufficient money, left the city, and set up in business for himself. But failing, he returned to Rome, and was so reduced in circumstances that he was employed in turning a hand mill, grinding corn for a baker. While thus occupied he wrote three comedies, which were successful; and from that time he wrote constantly, and became the favorite comic dramatist both of the higher and lower classes. His plays continued to be performed after his death, certainly as late as the reign of Diocletian. The grammarian L. Ælius Stilo declared "that the Muses would use the language of Plautus, if they were to speak Latin." Cicero considers his wit as equal to that of the old Attic comedy. Aulus Gellius calls him *homo linguæ atque elegantiæ in verbis Latinæ princeps*. With his works St. Jerome used to refresh himself after spending nights in tears for his sins. There is great uncertainty as to the number of the plays of Plautus. When Varro wrote there were 130 which went under his name, although some were not considered his, being supposed either to have been written by another person of the same name, or to have been old plays rewritten and improved by the poet himself. Varro could enumerate only 21 which were without any question authentic. L. Ælius placed the number at 25. Those mentioned by Varro were the comedies most carefully preserved, and are all extant with one exception, the *Vidularia*, which being last was probably torn off in the manuscript. Molière imitated the *Amphitruo* in his *Amphitryon*, and the *Aulularia* in his *Avare;* and Shakespeare the *Menæchmi* in his "Comedy of Errors." The *Amphitruo* was also imitated by Dryden in his "Two Socias;" the *Mostellaria* by Fielding in "The Intriguing Chambermaid," and by Regnard in "The Unexpected Return;" and the *Trinummus* by Lessing in his *Schatz*. The *Captivi* is usually considered the finest work of Plautus, and has been pronounced by Lessing "the best piece which has ever come upon the stage." His plots were mostly taken from the Greek writers of the new comedy, although in his treatment of the subject he does not slavishly adhere to his models. Horace censures him for the inharmoniousness of his lines and the coarseness of his jests. It is a singular fact that the real name of this poet was not known until it was demonstrated in an essay published by Ritschl in 1842, that it was Titus Maccius, and not Marcus Accius, as it had always been printed. The text of Plautus is very corrupt, some of the scenes having been forged at a later period. A palimpsest manuscript was found in the Ambrosian library of Milan, which was as old as the 5th century, and this also contains interpolations. The *editio princeps* was published at Venice in 1472, by Georgius Merula. The best modern editions are those of Bothe (4 vols. 8vo., Berlin, 1809–'11) and Weise (2 vols. 8vo., Quedlinburg, 1837–'8). Thornton and Warner translated all the plays into English (5 vols. 8vo., 1767–'74).

PLAYFAIR, JOHN, a Scottish natural philosopher and mathematician, born in Benvie, Forfarshire, March 10, 1748, died in Edinburgh, July 19, 1819. He was the eldest son of James Playfair, minister of Benvie, and was sent at the age of 14 to the university of St. Andrew's to be educated for the Scottish church. Here he showed so remarkable a talent for mathematics and natural philosophy, that he was occasionally selected by Professor Wilkie to lecture to his classes on natural history; and at the age of 18 he offered himself as a candidate for the mathematical chair in the Marischal college of Aberdeen. Of 6 competitors two only excelled him, and the successful one, Dr. Trail, attributed his success chiefly to his greater age. Upon the death of his father in 1772 he was induced, as a means of providing for the support of his mother and the education of her younger children, to enter the ministry, and in 1773 he obtained possession of his father's living of Benvie, the duties of which and the education of his younger brothers chiefly occupied him during the next 9 years. In 1779 his first scientific paper, "An Essay on the Arithmetic of Impossible Quantities," was published in the 68th volume of the "Philosophical Transactions." In 1782 he resigned his living to become a private tutor; and in 1785, in consequence of an arrangement between Dr. Adam Ferguson and Dugald Stewart for an exchange of chairs, he became joint professor of mathematics with the former in the university of Edinburgh. In 1805 he was appointed general secretary of the Edinburgh royal society, and in the same year succeeded Dr. Robison as professor of natural philosophy, which position he held until his death. His literary productions comprise contributions to the "Transactions of the Edinburgh Royal Society" and the "Edinburgh Review," and a number of separate publications, of which a collected edition appeared in 1822 (4 vols. 8vo., Edinburgh). In 1795 appeared his "Elements of Geometry," prepared for his university classes, and of which many editions have been published. It was succeeded in 1803 by his "Illustrations of the Huttonian Theory of the Earth," his most labored work, and one distinguished alike by clearness of reasoning and the skill and eloquence with which facts are made to support and explain the system. In 1815–'16 he made an extensive geological tour in France, Switzerland, and Italy, to procure materials for an enlarged edition of the "Illustrations," which however he did not live to complete. In 1814 he published for the use of his classes "Outlines of Natural Philosophy" (2 vols. 8vo.), containing the substance of his lectures. His last important work was the elegant "Dissertation on the Progress of Mathematical and Physical Science," prepared for the "Encyclopædia Britannica," and left by him in an incomplete state. Lord Jeffrey says: "He possessed in the highest degree all the characteristics of a fine and a powerful understanding, at once penetrating and vigilant, but more distinguished perhaps for the caution and sureness of its march, than for the brilliancy or rapidity of its movements;" and he adds that he "was certainly one of the best writers of the age."

PLAYFAIR, LYON, an English chemist, born in Bengal in 1819. He was educated at St. Andrew's university in Scotland, and in 1834 studied chemistry at Glasgow under Professor Graham, the present master of the mint in England. Subsequently he became a pupil of Liebig at Giessen, where he took the degree of doctor of philosophy; and upon his return to England he published a translation of Liebig's "Reports on the Progress of Organic Chemistry." For several years subsequent to 1843 he held the position of professor of chemistry at the royal institution in Manchester, and during the same period was a member of the commission for investigating the sanitary condition of the large towns of England. He took an active part in the movements preliminary to the opening of the great exhibition of 1851, and for his efficient services during the whole exhibition was appointed by the queen a ompanion of the bath. He was subsequently ppointed inspector-general of museums and chools to the government, and in 1858 was lected to the chemical chair in the university f Edinburgh, which position he still occupies.

PLEADING. The pleadings in a cause are he alternate allegations, by plaintiff and de-endant, of those matters of fact which constitute on the one hand the ground of action, nd on the other the ground of defence. The cience of pleading in general consists of the rinciples of those rules and formulas according o which, for the sake of method and certainty, hese allegations are uniformly expressed. Spe-ial pleading is the invention of the English common law; it is particularly designed to develop the precise point in controversy, and to resent it in a shape fit for decision. Other ystems allow the parties to make their statements independently of each other and at large, nd then require the court, or sometimes the itigants themselves, to select from the undigested mass, as precisely as may be possible, the matter of dispute. But it is the distinctive feature of the English method that it compels the parties themselves so to guard and narrow their respective statements, that the particular question for decision, and nothing else, shall be developed in the first instance. The very essential effect of this pleading is to clear away the undisputed or immaterial matter which conceals the issue. The system of English pleading, as it existed before its overthrow 10 years ago, was one of great antiquity. Like the *brevia* or writs, that is, the formulas which were essential to the institution of different kinds of suits, pleading originated probably among the Normans, and was introduced by them into England at the time of the conquest. To go still further back, it may perhaps be safely asserted that the *brevia* and pleading of the English law had a remoter origin in the Roman jurisprudence; for it can hardly be doubted that the forms of procedure, which were their immediate models, were, like those of other continental nations of that age, framed on precedents furnished by the imperial or even by the ancient law of Rome. It has been well suggested, however, that the strict and subtle technicalities of the English pleading, which most resembles the earlier Roman forms, were not borrowed from them, but were rather the fruit of the school logic of the middle ages. It is to the period of the later and more liberal Roman law, if to any, that we owe the suggestion of any of our forms of pleading.—The pleadings were once oral altercations in open court in the presence of judges. This was certainly the mode of pleading in the time of Henry III., in the earlier part of the 13th century; and it is supposed to have continued until a much later period. These oral pleas were made either by the suitor himself or by his pleader, who was called *narrator* or *advocatus*. It was the office of the presiding judges to direct the allegations of the parties so as to develop an issue, that is, a specific matter, which one party affirmed and the other denied. While these pleadings were going on, an officer of the court made minutes of the declarations of the parties, and added to them memoranda of the issue and of the acts of the court and the parties during the progress of the cause. These official notes formed the record, and were completed by the addition of all the material incidents in the case until it was finally disposed of. That part of the record which preceded the issue comprised the pleadings alone, and these, it has been seen, were for a long time oral. Gradually the practice changed. At first probably the allegations, though made alternately as before, were now entered on the record in the first instance, and by the pleaders themselves. This seems to have been the mode in the reign of Edward IV., in the latter part of the 15th century. It was no doubt for the purpose of avoiding the inconveniences of this method that the modern plan was devised of putting the pleadings in separate papers, and either mutually exchanging them or filing them in the proper office of the court, when at a subsequent stage of the proceedings they were all together copied into the court records. It would be a long labor, if indeed it were possible, to follow out the historical development of English pleading. It is enough to say that it had become a most elaborate and intricate science, and was so for a century or more. The system, which had been designed to reduce to the utmost simplicity and certainty the controversies of suitors, had become so overgrown and embarrassed with refinements and technicalities as to be very often rather a hindrance than a help in the prosecution of causes. That the system still possessed great excellence could not be denied; but it was equally clear that in various respects it was mischievously technical, subtle, and absurd, and that in many ways it could be put to bad uses. These abuses of pleading grew in great part out of the undue prominence which had been permitted to its incidental and purely formal parts. Its substantial elements, consisting indeed only of those plain logical processes which are inseparable from the orderly examination of every disputed proposition, did not deserve the reproach to which the perversion of some artificial rules had exposed the whole science of pleading.—A sketch of the more usual forms of pleading will show the distinction which may be made between matters of substance and matters of form, and will properly preface a notice of the present modes of process. The single design of special pleading was, by eliminating all else, to reach the distinct point in controversy for the purpose of submitting it to a court or jury. In the outset of the case, therefore, the plaintiff set forth simply the facts which gave him, as he claimed, a good cause of action. This declaration, like every other good pleading, contained, or rather implied, a complete logical proposition. Its major premise was the general principle or rule of law, within which the minor premise, that is, the particular facts, were supposed by the plaintiff to be included, and the conclusion or legal inference was that judgment which he sought from the court or jury. But as it is one of the fundamental principles of the theory of pleading that legal propositions are never to be recited, but are presumed always to be in the mind of the court, the major premise and the conclusion are suppressed, and the declaration is reduced to the statement of the mere facts. Now comes the defendant, who in his answer or plea may, in the first place, traverse or deny the plaintiff's facts. If he does so he also proposes a trial of the point thus affirmed on the one side and denied on the other. If the plaintiff accepts the tender, and he must do so if it be well made, the parties are at issue and the pleadings are at an end. But the defendant may be willing to admit the facts, but may conceive that they are not included in the proposition of law on which the plaintiff in fact rests, and so do not afford a sufficient legal ground of action, or that they are stated in a form which violates some of the rules of pleading. In neither case has he any facts to adduce, and therefore instead of pleading he demurs; that is to say, as the derivation of the word imports, he waits to see whether in the opinion of the court he must answer. This demurrer may be general, suggesting that the declaration is insufficient in point of law, or it may be special, assigning particularly that it is and how it is inartificial and so defective in form. Again, the defendant may neither traverse nor demur, but may admit or confess, as the phrase is, the plaintiff's facts, and allege new facts in avoidance of them. In the first pair then, so to speak, of substantial pleadings, the defendant must either demur, or plead by way of traverse, or by way of confession and avoidance. In the first two cases an issue, in one instance of law, and in the other of fact, is necessarily produced. In the last, the pleadings must still go on until one of these issues is reached, the subsequent pleas being alternately by plaintiff and defendant—replication, rejoinder, surrejoinder, rebutter, and surrebutter. Further than the last the pleadings rarely extend; for as no case can involve an inexhaustible store of new and relevant facts, there must soon be an end of pleas in confession and avoidance, and an issue of fact or of law will then be easily developed. These various forms of pleas, traverses, demurrers, tender and joinder of issue, and the various forms of general and special issues, form the essential parts of pleading. But beside these there belonged to the science certain accidental parts, such as dilatory pleas and pleas in abatement, by which a party excepted to the jurisdiction of the court, to the competency of the plaintiff, or to the writ or declaration; imparlances of several kinds, profert and oyer, counterpleas, new assignments, and numerous others incident to the various phases of suits, all of them contrived to render the procedure more exact and certain, and all of them essential in greater or less degree to the system. Some of these rules, however, as well substantial as accidental, concerned mere matters of form. The violation of these rules was good ground of demurrer. For example, of the multiform rules which governed the production of the issue, of those particularly which demanded its unity, certainty, directness, and materiality, many were purely formal. Defects in these respects were taken advantage of by special demurrers. These pleas did not regard at all the merits of the case; they did not deny that the party whose pleading was objected to had a good ground of action or of defence; but simply raised the question whether the statement or denial of facts was made in that particular technical way which the rules of pleading required. Even though the cause of action was confessedly good, yet if the statement was inartificial (and in England, the question whether it were or not could be carried through all the courts, and even to the house of lords), the party must submit to loss of his suit or pay often heavy costs to the other side for the privilege of amending. The art of pleading possessed, then, two distinct systems of rules, the substantial and the formal. So far as only the former were looked at, the science was justly pronounced ingenious and excellent. In this view it deserved such praise as that of Lord Mansfield, who said that "its rules were founded in strong sense and in the soundest and closest logic;" of Sir William Jones, who declared that "the system was reducible to the strictest rules of pure dialectic;" or of Chancellor Kent, who pronounced it "a science equally curious, logical, and masterly." But there was another aspect of the matter which was not so engaging. Thus Sir Edward Coke, who, in language often quoted, spoke of good pleading as the sure oracle of the law, the very *lapis Lydius* or touchstone of its true sense, yet admitted that "in diligently considering the course of the books of years and terms, from the beginning of the reign of Edward III., he observed that more jangling and question grew upon the matter of pleading and exceptions to form than upon the matter itself." In short, the formalities and technicalities devised and insisted on, though they were for the sake of securing greater nicety, had become so numerous; so many fictions had been engrafted on the system for the same purpose; so completely, by the gradual accretion of all sorts of refinements and the want of judicious legislative interposition in removing them, had the substantial rules of pleading been overbalanced and often defeated by those which were only formal; by all these means, so many technically fair but really unfair advantages were offered to dishonest and quibbling pleaders, that at last the complaints against the whole science of special pleading became so loud, that nothing but its almost entire abolition could quest them. Partial and important reforms were effected in the reign of William IV. The statute 3 and 4 William IV., c. 27, § 36, swept away 50 or 60 forms of actions, leaving then only 6, or, including the 3 real and mixed actions, dower, *quare impedit*, and ejectment, 9. The so called new rules of Hilary term, 1834, simplified these remaining forms of action, and rearranged the pleadings connected with them, so that they recovered in good part some of their old vigor and excellence. But that which they sought to do and partially did, was more effectually accomplished by the common law procedure act of 1852. In that year the commissioners appointed to report upon the subject proposed to parliament a system of pleading which, with slight exception and variation, was then adopted, and now regulates the process of the English courts. The commissioners ranked the most prominent objections to the science of special pleading under 5 principal heads, viz.: the admission of fictions; prolixity of forms; the allowance of arrests of judgment after verdict, on the ground of defects in the pleadings once passed by and then first taken advantage of; vagueness and uncertainty in some cases; and finally, unnecessary precision and undue technicality in others. With respect to the first of these classes, the report proposed that all rules which compelled fictitious recitals and purely immaterial statements should be annulled. This suggestion reached the fictions involved in trover and ejectment; the fiction of color, that is, the pleading of feigned matter by means of which the party averring it seemed to have a good cause of action, though in truth he had only an appearance or color of cause; and all the like artificial contrivances. Prolixity was to be avoided by the adoption of short and plain forms in the place of the tedious verbiage of the old-fashioned pleadings. Arrests of judgment after verdict were matter of just complaint. They were granted, for instance, on motion of a plaintiff, when, though a verdict had been found for defendant, the former could show to the court that the plea was not a legal answer to the declaration; or when a good and a bad count had been inserted in the declaration, and damages had been given generally; for the law held in such a case, that it was impossible to discriminate between that part of the penalty which was inflicted for the matter laid in the good count and that charged in the bad. These abuses were also corrected by the act. The objection of undue precision and technicality was also well made. It particularly applied to the so called rules for the production of an issue. If their several requirements were violated by false averments of time, quantity, or quality, even though these points were immaterial; by duplicity, that is, by the allegation of several distinct matters in support of a single demand, or the setting forth of several distinct answers to a plea; if they offended by repugnancy, ambiguity, or obscurity; if they stated that argumentatively, or in the alternative, which ought to have been stated directly and positively; no matter what might be in these cases the substantive merits of the cause, it could easily be hindered and even defeated by the operation of a special demurrer. The commissioners wished to retain some of the rules which have been just now referred to, proposing to restrict them within limits which would secure their legitimate operation; but it was special demurrers which had particularly excited the popular dislike of the system of pleading, and it was found impossible to save any rules on which these objectionable pleas could establish themselves. With trifling qualifications, all the reforms proposed by the commissioners were adopted by the procedure act. No ground of special demurrer was allowed to remain. The still surviving forms of action, assumpsit, debt, covenant, trespass, case, with their venerable subtleties, were abolished. The old terms of art and technical forms of pleas were all cleared away, and the whole theory and intent of the present mode of procedure under the act are directed to the framing of simple narratives of facts by plaintiffs, and plain and fair answers to them by defendants. It is more than probable that for the sake of method and certainty some rules of form will still be found indispensable, and will be gradually developed; but these will be framed in consonance with that modern, equitable, and enlightened administration of law of which the abolition of the difficult and in great part useless art of pleading is one of the clearest and worthiest evidences.—In the older United States the science of special pleading had been received as part and parcel of the common law; but many of its more odious features either were never adopted, or were early, or have been gradually, reformed by legislative enactments. Still the system preserved enough of its faults, even with us, to excite complaint, and to provoke demands for its removal. The most remarkable reform thus made in this country was perhaps that effected in New York in 1848. In that year the separate equity jurisdiction which had hitherto existed there was suppressed. The code adopted for the regulation of legal processes expressly declared that in the future there should be no distinction between legal and equitable remedies; the common law practice and pleading were put out of the way, and gave place to the present system, which, in its general features, very closely resembles the equity procedure. One form of action only is allowed. The pleadings are few, concise, and must be framed in language easily understood. Allegations are to be liberally, not strictly, construed. Facts are to be respected rather than pleadings; and the latter may at any time in the progress of the suit be revised and accommodated to the proofs. In all respects the code seeks, by the utmost liberality, to assure easy and efficient remedies to suitors. Changes have been made in a like spirit, and in the same direction, in

Massachusetts and in other states; and to no part of the whole province of jurisprudence has reform addressed itself in this country more earnestly and more acceptably than to the reconstruction of the forms of process, and to the restoration of its essential efficiency and simplicity to the necessary science of pleading.

PLEBEIANS (Lat. *plebeius*, from *plebs*, the common people), a class of Roman citizens not included either among the patricians or the clients. Their origin is doubtful, although it has been supposed that they were inhabitants of the conquered territories, or were clients who had dissolved their connection with their patrons, or partly both. Originally the plebeians were excluded from the senate, from all offices of state, from the making of laws, and from marriage with the patricians. The constitution of Servius Tullius recognized their political existence, and divided them into tribes. Tarquinius Superbus, however, abolished all the privileges conferred on them by the preceding king; and although on his expulsion these were professedly restored, yet when all fears of his return had been laid aside their condition was exceedingly grievous. The first important step made toward their full consideration in the commonwealth was the establishment of the tribuneship in 494 B. C., a privilege which was still further increased by a law of Volero Publilius in 471 that the election of these magistrates should take place in the *comitia tributa*, in which the power of the plebeians was predominant. After the overthrow of the decemvirs, another point was gained by the *lex Valeria Horatia* in 449, which declared that the *plebiscita*, or decrees of the *comitia tributa*, should be of equal authority with the decrees of the *comitia centuriata*, and should become laws if sanctioned by the senate and confirmed by the *curiæ*. A change in the constitution was again made in 445, by the law of the tribune Caius Canuleius, which legalized the marriage of the two classes; but the demand of his colleagues that the consulship should be thrown open to plebeians was so strenuously resisted by the patricians, that a compromise was finally agreed upon, in accordance with which was established the new magistracy of military tribunes with consular power, to which members of both orders were declared eligible. Yet this was but a barren victory, so far as regarded its immediate effects, as the tribunes were usually chosen from the patricians. But the great point was finally gained in 366, by the passing of the Licinian laws, one of which abolished the office of military tribune, and declared that one of the consuls should always be a plebeian. The rogation to that effect was proposed in 376 by C. Licinius Stolo and Lucius Sextius, and the reading of it was then stopped by the 8 other tribunes, who had been gained over by the other party. Year after year these two men were elected to the tribuneship in the face of the fiercest opposition of the great patrician houses; but after 10 years of struggle their rogations became laws. Afterward the dictatorship, censorship, prætorship, and finally by the *lex Ogulnia* in 300 B. C. the priesthood were thrown open to plebeians. The *lex Valeria* was extended by the law of the plebeian dictator, Q. Publilius Philo, passed in 339, providing that the *plebiscita* should not require the confirmation of the *curiæ* in order to have the force of laws; and it was still further extended by the *lex Hortensia* in 286, declaring that they should not need the sanction of the senate. Henceforth the distinction between the two orders gradually disappeared.

PLEIADES, a celebrated group of stars situated on the shoulder of the constellation Taurus, regarded by Mädler as the central group of the system of the milky way. Alcyone, the brightest of the Pleiades, a star of the 3d magnitude, is considered to occupy the apparent position of the central point round which our universe of fixed stars is revolving.

PLEODONT. See LIZARD.

PLESIOSAURUS, an extinct gigantic enaliosaurian or marine reptile, found principally in the lias (secondary) formation of England, in company with the still larger ichthyosaurus. The head was of small size, supported on a long, flexible, snake-like neck, the body and tail short, with 4 limbs in the shape of powerful swimming paddles, like those of turtles or cetaceans; the skin was probably naked. This singular genus, named by Conybeare, to a lizard's head united the teeth of a crocodile, a neck like a serpent's body, the trunk and tail of a quadruped, the vertebræ of a fish, the ribs of a chameleon, and the fins of a whale. The apertures through which the air was respired are just in front of the orbits on the highest part of the head, and not at the end of the snout as in crocodiles; the paddles were probably invested with a sheath of integument, and from the natural curvature of the bones must have had a more elegant and tapering form and greater flexibility than in cetaceans. From the above details of structure it has been supposed that this animal paddled along, rather slowly, near the surface of the water, with its long neck raised and arched like that of a swan, ready to seize any fish or other marine animal which came within its reach; at times also concealing itself among the sea weeds in shallow places, its body immersed, and breathing carried on through the apertures on the top of the head; it was neither so active nor so formidable as the more robust ichthyosaurus. There are nearly 20 species described, of which the best known is the *P. dolichodeirus* (Conyb.), which attained a length of 10 to 12 feet; there were about 50 teeth in each jaw; the neck was as long as the body and tail together, having 33 vertebræ, 10 more than the longest neck of a bird; the ribs were united in front by several cartilages, enabling the animal to readily and fully inflate the lungs, and take in a supply of air for a prolonged immersion; the coracoid bones were very large, producing an elongation of the sternum, and indicating that the animal was aquatic, and able only with difficulty to drag itself along on land. The less strong and less numerous teeth show a less carnivorous disposition than in the ichthyosaurus; the lighter general conformation was suited rather for tranquil waters than to encounter powerful waves. Species are found also in the oolite and cretaceous strata, though less abundantly than in the lias, in which their numerous remains and coprolites show that the waters must have swarmed with them. For full details on the species, see Owen's "Report on British Fossil Reptiles," in "Reports of the British Association" for 1839.—The genus *pliosaurus* (Owen) includes the gigantic reptiles of the Oxford and Kimmeridge clays of England, intermediate between the plesiosaurus and the ichthyosaurus; the teeth and the bones of the limbs and trunk were like those of the former, the first being stouter and more trenchant; but they had the short neck, massive head, and cetacean-like form of the latter genus. It is interesting to note that pliosaurus did not appear until after both the genera which it in part resembles; no fragment of their bones, according to Pictet, has been found in the lias or oolite, and none until the time of the Oxford clays. The best known species is the *P. brachydeirus* (Owen), for an account of which see Owen's report in "Reports of the British Association" for 1841.

PLESSIS-MARLY, Seigneur du. See Mornay.

PLETHO. See Gemistus.

PLEURISY (*pleuritis*), inflammation of the pleura, the membrane which lines the chest, and also covers the lungs. Pleurisy has been recognized and described as a distinct disease from the earliest times, but practically, before the discoveries of Laennec, it was impossible in many cases to distinguish it from pneumonia. The disease, though rare in old age and in early infancy, is confined to no period of life. Prolonged exposure to cold, external violence, and the existence of tubercles of the lungs may be considered its most frequent causes, though in many instances we are unable to trace it to any particular source. The disease may be either acute or chronic. Acute pleurisy ordinarily commences with a chill, which is soon followed by a sharp pain limited to a single spot, and most commonly seated just below the breast on one side. This pain is often very intense, preventing the patient from taking a full breath, and increased by motion, by pressure, and by cough. It lasts a variable length of time, but gradually subsides as effusion takes place. In not a few instances pain is altogether absent. Cough comes on early, is short and commonly dry, and adds greatly to the distress of the patient. The respiration early in the disease is short and difficult; as the pain subsides the patient breathes more easily; but when effusion to any amount has taken place, any exertion rarely fails to render the breathing abnormally frequent. Before effusion takes place the patient commonly lies on the back or sound side, rarely on the affected side; after it the patient generally lies on the back or on the affected side. Fever is commonly present, the skin is hot and dry, the pulse frequent and sometimes hard, the urine scanty and high-colored. In the first stage of acute pleurisy the respiratory murmur is feeble, and the breathing, as before observed, is short and jerking; very early in the disease friction sounds, either slight and grazing or rubbing in character, may be heard; these depend on the exudation of plastic lymph. During this period the percussion sound remains almost or entirely unaffected. Sometimes the disease stops short at this point. Where effusion takes place, the most depending part of the chest on the affected side gradually becomes dull on percussion; as this dulness increases the respiratory murmur is lost on auscultation, or is replaced by a distant bronchial breathing; the friction sound is lost over the part occupied by the fluid, though it may sometimes still be heard above it. The vibratory thrill that is felt by the hand applied to the walls of the chest when a patient speaks is abolished over the seat of the effusion. When the effusion is moderate in amount, the height to which it rises posteriorly can very readily be marked out by percussion, and this will be found to vary with the varying position of the patient. It is at this time, and commonly near the inferior angle of the scapula, that a peculiar modification of the voice, ægophony (Gr. αἴξ, a goat, and φωνή, voice), can be heard by the ear or stethoscope applied to the walls of the chest while the patient is speaking. It consists of a variety of bronchophony in which the voice acquires a tremulous, cracked character, which has been compared to the bleating of a goat. When the effusion is very great it distends the pleural sac, the lung deprived of air being compressed against the spinal column. The diaphragm is now pushed downward, the intercostal spaces are bulged out, the side is larger by measurement than the opposite one, and is comparatively motionless in respiration. The heart is displaced, and when the effusion is on the left side can sometimes be felt beating to the right of the right nipple. In cases of recovery, as the fluid is absorbed the respiratory murmur and normal percussion note gradually return from above downward; for a long time, however, and sometimes permanently owing to the thickness of the false membranes formed from the plastic lymph effused, the respiratory murmur is feeble and the percussion sound dull at the lower part of the side. In some cases the side is restored to its natural form; in others it becomes retracted, the shoulder being drawn down, the ribs approximated, the spine curved, and the whole side rendered smaller and sunken.—When acute pleurisy occurs in a strong and healthy young adult, general bloodletting may be required; but in a majority of cases local bloodletting by means of cups and leeches is all that is necessary, and this has a remarkable influence over the pleuritic pain. Homœopathists avoid bloodletting by the use of aconite, aconite and bryonia, or colchicum. After bloodletting diuretics may be administered, and of these the best are the acetate and bitartrate of potassa, digitalis, and squill. Where the disease is obstinate it may be advisable to give mercury, but it should be given in small doses and stopped immediately upon the slightest signs of ptyalism being evinced. When the acute symptoms have subsided, the application of a succession of blisters to the affected side has a decided influence in promoting the absorption of the effusion; or instead of blisters, resort may be had to bromide and iodide of potash, or a course of sulphur. The diet should be low, and the patient where the effusion is extensive or increasing should abstain as much as possible from fluids. Perforation of the thorax has been recommended, and it would appear from numerous trials that, performed carefully, the operation is attended with little risk; but in acute pleurisy it should only be resorted to in those rare cases in which the amount or rapid increase of the effusion threatens the patient with immediate suffocation. In such cases care should be taken by the use of a proper instrument to prevent the admission of air into the thorax.—In chronic pleurisy the effusion remains for a long time stationary, and either gives rise to an acute febrile excitement or to one of a hectic character. It may be the result of an acute pleurisy, it may come on in patients debilitated by previous disease, or it may be complicated with the tubercular diathesis, the last being the case in the majority of instances. The effused fluid may be either serum mixed with flocculent lymph or pus. When the strength of the patient is good, a gentle mercurial course with diuretics and the use of flying blisters or ioduretted liniments will often succeed in removing the effusion. Bromide and iodide of potash are often all that is necessary. If the patient be broken down, tonics and cod liver oil with iodine may be advisable, while ioduretted liniments are freely employed. In young persons, particularly in children, if there be no tubercular complication, the operation for empyema is generally successful.—In some persons pleurisy gives rise to extensive effusion without causing any symptoms to attract the attention of the patient. Sometimes a person may be seen with one pleural cavity distended with fluid, and yet pursuing his ordinary occupations scarcely conscious that he is ill. This is latent pleurisy, the treatment of which is the same as in acute pleurisy, except that it should be less active.

PLEURO-PNEUMONIA (Gr. πλευρα, the side, and πνευμων, the lungs), an inflammation occupying the pleura and the substance of the lungs at the same time. The term pleuro-pneumonia is also applied to a peculiar epizootic disease among cattle, which is especially characterized by certain lesions of the thoracic organs. Although writers have attempted to trace the history of this affection to the most remote periods, no description sufficiently exact upon which to found any decided opinion had been offered previous to the year 1765, when Bourgelat, the founder of the royal veterinary school of France, gave an excellent account of pleuro-pneumonia as it occurred among the cattle of Champagne. Until 1792 the disease appears to have been confined chiefly to the cattle of the mountainous regions, such as the Vosges, the Jura, the Alps, Upper Silesia, and Piedmont; but soon after that date, and until the year 1820, it extended through the most of Europe. This period was marked by desolating and bloody wars, and the movements of troops, carrying with them large numbers of cattle for their support, are supposed by many writers to have been the cause of this extension. From 1820 to 1827 the disease invaded the highly cultivated regions and rich valleys of Italy, Germany, and France, where it has continued to a greater or less extent to the present time. Pleuro-pneumonia was introduced into Holland in 1833, and committed the most terrible ravages, particularly in the southern portions. According to the official reports, Holland lost, from 1837 to 1839, 28,000 head of cattle by this disease alone. It made its appearance in Belgium in 1837, and in England in 1841. During the winter of 1859 and 1860 this fatal disease became very prevalent in the London dairies, more particularly upon the S. side of the Thames. The attacks were marked with much virulence, and the fatality was reported to be as great as 95 per cent. From its introduction into England in 1841 until the present time, pleuro-pneumonia has existed not only in the United Kingdom, but also in most of the countries of northern and western Europe.—The disease first appeared in the United States, in the states of New York and New Jersey, in the year 1843, introduced, as it was supposed, by a cow imported from Germany. It however did not spread to any extent, and does not seem to have attracted much notice. In the spring of 1859 pleuro-pneumonia made its appearance in Massachusetts, and during that year destroyed many cattle. Affections of the lungs had always been observed to a limited extent either as the result of common inflammation, or of improper management as regards stabling and food; but nothing possessing the characteristics of the present epizootic had ever been noticed. The disease first made itself apparent in a cow which had recently arrived from Holland, having been imported together with two other cows and a heifer by Mr. Chenery. These animals were obtained from Purmerend, about 10 m. N. of Amsterdam, where no disease was known to exist at the time. They were sent to Rotterdam, where pleuro-pneumonia is said to exist generally to a greater or less extent, and there they remained several days before being shipped. After a passage of 47 days they arrived at Boston. On examination they were found to be in a bad condition, being much emaciated and bruised, and one of them unable to stand. They were taken to Mr. Chenery's farm, situated upon a high hill in the town of Belmont, about 6 m. N. W. from Boston. The barn in which they were placed is square, about 50 feet each way, and the part in which the cattle are kept not far from 8 feet high. The arrangement is such that the heads of the animals are directed toward a square opening in the centre, from which they are fed. There is an opening in the roof for ventilation, and a few windows in the sides of the barn. The building, being closely and substantially constructed, was undoubtedly deficient in ventilation, particularly considering the number of cattle which were housed within it, 42 at the outbreak of the disease. The first of the cows in a bad condition when landed at Boston died at the end of a week, on May 31, and the second two days after. They were not examined, it being supposed that they had died solely from the effects of the voyage and the treatment they had then received, and not from any disease of the lungs. About a month after this the third cow was found to be sick. She died after an illness of 9 days, and 75 days after leaving Rotterdam. There was no post-mortem examination. The fourth animal remained in good health. About Aug. 1 a cow imported from Holland in 1852 was taken sick and died in 20 days. From this time other fatal cases followed in rapid succession, so that in the course of two months Mr. Chenery had lost about 30 animals. Examinations were made, and it was abundantly shown that the disease was essentially an affection of the lungs and pleura. No isolation was thought necessary or attempted until Sept. 1, and then only for a short time. This was not practised again until the ensuing spring. No attempts were made to prevent the communication of the disease to cattle in the adjoining pastures, and notwithstanding this freedom of communication no instance of such transmission is known to have occurred within 20 m. of Belmont. Mr. Chenery lost no cattle from pleuro-pneumonia after Jan. 8, 1860. The day on which the first cow died (June 20), 3 calves were sold to a farmer in Brookfield, a town about 50 m. W. from Belmont. They were taken by railroad the entire distance, with the exception of the last 5 m. On the way, while being driven, one of the calves was observed to falter, and at the end of the journey was evidently sick. It was then placed in a barn where there were 40 head of cattle, and remained there 4 days. Afterward it was placed in another barn containing 20 cattle, where it died in 10 days. The other calves remained well. About two weeks after the death of the calf, one of the oxen of the herd of 40 became sick and died after two weeks' illness. Two weeks after this another ox sickened and died, and afterward at longer or shorter intervals others died, until 17 oxen and cows were lost, and, as subsequently appeared, the whole stock became greatly diseased. During the winter, 6 or 8 of the oxen of the herd of 40, where the sick calf remained 4 days, were employed in teaming and apparently well. They remained a single night with a herd which afterward became diseased. Another animal of this same herd was sold to a man in a neighboring town, and he also lost a number of his cattle. A yoke of oxen also from this herd were sold and went into another herd in the same town, where they remained only 5 days, and one third of this last herd became diseased. This same yoke, still apparently in good health, were placed in a team of 22 yoke of cattle employed in moving a building a distance of 4 or 5 m. The whole of these cattle are said to have become diseased, and subsequently 11 other herds to which they belonged took the affection. It is a singular fact that animals which had become diseased in Brookfield were driven to other towns, and, although other animals were near them and much exposed during their passage, yet the amount of subsequent disease was very small, and it did not extend beyond a space of 10 or 12 m. square around Brookfield. The appearance of this malady in Belmont and Brookfield caused the people to seek from the legislature the enactment of such laws as would arrest the progress of the disease, and cause its extirpation if possible. Certain acts were passed, and a board of medical commissioners appointed to investigate the subject. Before they had entered upon their duties, however, the progress of the disease appears to have been stayed, and they were unable to discover any case or cases of the affection which were recent or in an active stage. Their investigations therefore were confined to the surviving animals which were diseased, or which were supposed to have been exposed to the disease. The results showed "that animals that had been ill and had recovered their usual signs of health presented more or less evidence of previous disease in the lungs, now completely arrested, and that some of those which had been freely and continuously exposed presented no evidence of disease either during life or after death." In no case did the examinations reveal disease in an active state. Directly or indirectly this epizootic proved fatal to nearly 1,000 head of cattle in Massachusetts.—The most unmistakable signs of pleuro-pneumonia are derived from auscultation and percussion of the chest, but we cannot by these means alone distinguish this disease from simple inflammation of the lungs. Among the earliest external symptoms is a peculiar short, dry, painful cough, observed more especially in the morning, or when the animal rises after lying down, or is allowed to drink. There is loss of appetite and a diminution in the secretion of milk. The animal becomes sluggish and dull, and if at pasture separates itself from the rest of the herd. There is an unusual dilatation and contraction of the nostrils, accompanied with a short, quick respiration. In young, powerful animals, the mucous membrane of the nose is at the commencement of the disease red and dry; but as it advances the color changes to a yellowish white, and there flows from the nostrils a clear and thin, or a viscid and variously colored fluid. Masses of hardened excretions, sometimes as large as the finger, are often thrown off from the bronchial tubes. Chills occur from time to time, and the horns and ears are alternately cold and warm. A peculiar stiffness affects the muscular system generally, and the animal shrinks from pain if pressure is made upon the chest behind the shoulders, or upon the lumbar regions. The local signs are often present in a slight degree for many weeks, without the manifestation of any constitutional symptoms. At the commencement of the disease in strong young animals the pulse is full and hard, from 25 to 40, instead of from 22 to 25 as in health; but in those which are weak and badly nourished it is soft and full. Finally it becomes in all soft and rapid. When the febrile symptoms first set in, the animals stand with the back curved upward and with the head and neck outstretched; as the disease advances, they almost always stand with the anterior portion of the body immovable. They rarely lie down, and then only for a short time, resting either upon the affected side or upon the breast bone. Toward the close of the disease, when suffocation is imminent, they lie with the head and neck stretched out and the mouth open. The hair loses its lustre and stands up, the skin becomes dry, and the perspiration has a peculiar odor. Appetite and rumination cease entirely in the febrile stage. The act of drinking is difficult and excites cough. The eye has a wild, staring look in the well fed, but in the weak and impoverished it is sunken in the orbits. From the dry mouth there flows more or less viscid, dirty, offensive fluid, or a frothy saliva. The urine is of a dark brown color, and has a strong odor. The fecal matter at the commencement of the disorder is less abundant, firm, and is also of a dark brown color. At a later period in the disease there is either constipation, or the fæces become hard and black, or green, watery, and offensive. The duration of the disease depends upon a variety of circumstances, upon the character of the epizootic, the strength and general condition of the animal, and more especially upon the length of the non-febrile or chronic stage. If this be long, the disease may last several weeks or even months. If, on the contrary, the febrile period make its appearance early, or at the commencement of the disease, the latter may terminate in from 7 to 14 days, seldom earlier, and often later. If the affection is to prove fatal, there is great emaciation; the extremities, the ears and horns become cold, the respiration is more and more labored, and life terminates either from suffocation or extreme weakness. An imperfect recovery may sometimes take place, and the animal afterward die of an effusion into the pleura and pericardium, or of a chronic pulmonary œdema. Occasionally complete recovery takes place, but this is only possible when the disease is checked at the commencement or at an early period.—The morbid appearances in pleuro-pneumonia vary according to the period at which the animal dies or is killed. In animals killed early in the disease no exudation is found, but the interlobular cellular tissue is, in isolated portions, more filled with blood than is natural. If the disease is a little more advanced, we find this tissue thickened by a deposit into its meshes which renders it firmer. The pulmonary tissue also becomes more or less œdematous, or filled with a watery fluid, so that in some parts no air can enter, while in others it is only partially excluded. At the commencement these appearances are generally seated in the deeper portions of the lung, the pleura not being affected. If, however, superficial portions are attacked, the pleura participates, becomes opaque, and still later is covered by a whitish layer upon its surface, and by a deposit beneath it similar to that mentioned as occurring in the interlobular tissue. In very rare cases, these changes take place not only in the interlobular tissue, or in this and the pleura, but also in the very substance of the lung itself, which is the seat ordinarily of œdema only. The disease generally attacks only one lung. In a more advanced stage the lung undergoes such changes as to present when cut a marbled appearance; this appearance occurs in masses of variable size, sometimes involving one quarter or one half of a whole lung. At the same time the pleura is covered with a layer of false membrane, the thickness of which varies in different cases. A similar product is found also upon the pleura covering the ribs; also upon the diaphragm and the pericardium. An effusion of fluid takes place into the cavity between the two pleuræ, more or less compressing the lung. Still later the lungs are found much enlarged, and their weight much increased, from 4 or 5 lbs. in their normal condition to 20 or 30 lbs. They are firm, compact, liver-like, and there is an absence of crepitation. The cut surface presents the same marbled appearance as before, only in a more marked degree. This peculiarity is owing to the decided contrast in color between the layers of infiltrated interlobular tissue, which is sometimes from one to two lines thick, and the lobules themselves which they enclose. A sort of network of a somewhat irregular quadrilateral form, not unlike the veining of some kinds of marble, is thus formed. From the cut surface a red serum or watery fluid flows, which when removed leaves the lung permeable to air.

On close examination the smaller air tubes do not present a trace of exudation, and in the larger ones the mucous membrane is perfectly normal. The new substance found in the interlobular tissue varies in different parts. When it is in contact with the lobules it resembles cellular tissue in process of formation. At the same time it cannot be distinguished from that which forms in other inflammatory conditions in the neighborhood of organized parts. The portion of new material furthest removed from the living tissue is frequently not organized, and may form a cheesy layer very friable and composed of distinct laminæ. As the disease advances, in many cases irregular portions of the lung of various sizes are partially or entirely separated, and afterward become enclosed in a sac of organized tissue several lines in thickness. This change is not unlike what we find in tubercular disease, excepting that in this last the encysted masses are much smaller. These masses are not always completely detached, but are retained in connection with the surrounding portions, thus remaining for some time partially organized. Within this sac in recent cases pus is found, sometimes amounting to a pint or more; and loose, floating in the pus, is the hard mass of separated lung tissue, easily recognized by its structure. In favorable cases, the fluid contained in the sac becomes gradually absorbed, leaving behind a yellow, granular, brittle mass, sometimes 3 or 4 inches in diameter. The smaller of these in course of time undergo further change, by which they are converted into chalky concretions. As a general rule these lie as inert masses, unconnected with the neighboring lung tissue, although sometimes giving rise to a good deal of irritation, and not unfrequently thus causing death. The condition of the blood in pleuro-pneumonia has not been sufficiently examined to enable us to decide with any certainty how far it varies from the healthy standard. In the other organs usually no changes are found, and if any exist they are not essential.—As to the nature of pleuro-pneumonia, there exists a great variety of opinions. Many regard it as a local and specific disease, and as eminently contagious; while others regard it as differing in no respect from ordinary inflammation of the lungs, occurring in an epidemic form, without the properties of contagion. As regards this point, Prof. Simonds, who may be properly regarded as the highest European authority on this subject, says: "Pleuro-pneumonia signifies inflammation of the pleura and the substance of the lungs; the disease itself was not really of an inflammatory character. On the question of its contagiousness, we had but too strong evidence that it was contagious, and unhappily for the country this fact had been too much lost sight of. In fact, this disease was an epizootic. . . . Many diseases were disseminated both ways. The morbific matter entered the system, and when seated there poisonous exhalations were given off. This was the case in small pox. After the disease had reached a certain stage, pustules were formed, and each pustule contained the same morbific matter as was originally inhaled. It was not the case that every animal exposed was infected, any more than it was with man. There must be a susceptibility as well as a cause. . . . The malady itself was not an inflammatory, but a local and specific one. The morbific matter enters into the blood by respiration, and then concentrates itself in the lungs. This affection was in many respects very peculiar. It is an eminently fatal disease. . . . It always was a fatal disease, and always would be. In no one case has an animal ever been cured; the disease is sometimes arrested, but never cured. . . . When does its contagion cease? is a question upon which there has been much discussion, and which is still undecided. As soon as the animal sickens, the disease is contagious. If it was arrested, it was not easy to say how soon the animal might safely mix with others." Delafond gives the following as a portion of the results of his investigations: "The malady, while in a herd of cattle, presents all the general characters of contagious affections. The number of well authenticated examples of contagion amounts to 505. It is not certain that those who take care of affected animals can communicate the disease to those which are healthy. Twenty-six veterinary surgeons of high standing in France, Germany, Italy, Switzerland, Belgium, and Holland, have published their opinion in favor of the contagiousness of the disease. The time of incubation is from 24 to 25 days; but as it is difficult to settle precisely the moment of contagion, we must admit that the time is from 30 to 40 days—more often within, very rarely beyond this. The nature of the virus, like that of all contagious diseases, is still unknown. Its seat appears to be the affected lung. The expired air, the nasal mucus, the saliva, the emanations from the affected organs, are the ordinary vehicles. Finally, the contagious atmosphere around the animals is limited, and cannot be carried far by currents of air." The evidence upon this point of contagion is exceedingly contradictory, and yet it is one of the most important questions, so far as the prevention or extirpation of the disease is concerned. Those who oppose the view of contagion see a sufficient cause in certain combined influences. They believe that the atmospheric conditions and those circumstances, of a character but little understood, leading to the spread of epidemics generally, are also in action in this. Both contagionists and non-contagionists admit that the disease may and does arise under circumstances which preclude the probability of any contagion, that the disease in fact may arise spontaneously. "If," says Wyman, "it arises spontaneously, then the circumstances for its propagation, if contagious, are the most favorable possible, and the disease should spread with the greatest certainty and rapidity; but this certainty and rapidity have not been observed to accompany spontaneous development."—As regards the origin of the disease in Massachusetts, there is no possibility that the first animal which sickened could have been exposed to any animal ill of the disease within 75 days, unless we assume that the two cows which died from supposed ill treatment on the voyage died of pleuro-pneumonia, of which there is no evidence whatever. There is no reason to suppose that the disease existed previously among other cattle of the herd, and we are therefore compelled to admit that it remained in a state of incubation during 75 days, or that it arose spontaneously at Belmont. On the other hand, the outbreak of the disease in Brookfield upon the introduction of the calf from Belmont looks very much like the product of contagion. At the same time, there are many points which are not easy of explanation. There is no doubt that animals became sick after the introduction of the calf among them, but it may be questioned whether the outbreak did not occur in consequence of certain other conditions, existing in a limited territory. How also can be explained the fact, that if any of the diseased cattle came in contact with a herd in Brookfield, the contact was said to be followed by disease in some of the herd; but when the diseased animals were driven to other towns, and mingled with other herds, such exposure was not followed by disease? The disappearance of the disease was also peculiar, and not such as would be expected if the contagious element was as great as has been represented. Without pursuing this subject further, we may remark that we do not consider that the contagious properties of pleuro-pneumonia are by any means clearly established. In other countries this disease has gone from place to place in the form of an epidemic, and has not been controlled by measures which, as a general rule, are found to control other contagious diseases. It pursued a similar course in Massachusetts; it took its origin in Belmont, spread for a time in certain localities while the epidemic influence lasted, and then disappeared. The most stringent measures of slaughtering and isolation did not prevent its diffusion.—With regard to the treatment of pleuro-pneumonia, very little that is satisfactory can be said. By way of prevention, the diseased animals should be immediately separated from the healthy. Especially should all overcrowding be avoided, and strict attention should be paid to proper ventilation and food. Experience has amply shown that inattention to these measures tends to produce disease among the healthy, and to increase its severity where it already exists. Inoculation has been practised in various countries, by inserting the serous fluid taken from the lungs of animals affected with pleuro-pneumonia into the bodies of the healthy, but with no satisfactory results.

PLEYEL, Ignaz, a German composer, born at Ruppelsthal, near Vienna, in 1757, died in Paris, Nov. 14, 1831. A pupil of Haydn, he visited Italy, where he became acquainted with Cimarosa, Guglielmi, Paisiello, and Pugnani. In 1787 he was appointed chapelmaster in the cathedral of Strasbourg, but lost this post during the revolution. A few years later, having removed to Paris, he became a publisher of music, and afterward established a pianoforte manufactory. He wrote trios, quartets, and sonatas for the piano, which had remarkable success in their time.—His son, Joseph Étienne Camille, also a composer and pianist, born in 1788, died in 1855, succeeded him in the direction of his manufactory, and made various improvements in the construction of the instruments. The pianist Kalkbrenner was his partner.—Camille's wife (Mlle. Marie Mocke), a pupil of Kalkbrenner, was once considered one of the greatest living pianists. She still enjoys a high reputation.

PLICA POLONICA (Lat. *plica*, to knit together), a disease of the hair bulbs peculiar to Poland, and so named from the manner in which the hair is matted together. In this disease the hair bulbs are said to become swollen and acutely sensible; they secrete a viscid substance having a smell of rancid fat, by which the hair is matted together, and this, growing to an extraordinary length and swarming with vermin, becomes horridly filthy and offensive. The general opinion is, however, that the disease is merely the product of filth and neglect, and requires for its cure nothing but the free use of the scissors and the subsequent application of soap and water. The writer once saw a Polish female patient who was said to have plica, in whom the growth of hair was enormous, and this, untouched for years by a comb, formed a tangled mass traversed by myriads of vermin; but under the superincumbent filth the hair bulbs were perfectly sound and natural.

PLINY. I. The Elder (Caius Plinius Secundus), a Roman author, born A.D. 23, died in 79. The two cities of Verona and Novum Comum (the modern Como) contended for the honor of being his birthplace, and the weight of authority seems to incline in favor of the latter. He belonged to a noble and wealthy family, and when 23 years old served in Germany under L. Pomponius Secundus, whose life he afterward wrote, and was made commander of a troop of cavalry. While serving in this region he composed a treatise *De Jaculatione Equestri*, and began a history of the Germanic wars, which was finished in 21 books. Returning to Rome in 52, he studied jurisprudence, and practised as a pleader, but does not seem to have been very successful. About this time he wrote a treatise, in 3 books, on the education of an orator, entitled *Studiosus*, and during the reign of Nero composed a grammatical work in 8 books, called *Dubius Sermo*. Appointed procurator of Spain, he held that office until a little before A. D. 73, when he returned to Rome, and became an intimate friend of Vespasian. Probably at this time he continued the history of Aufidius Bassus, in 31 books, which brought the narration of events down to his own time. An account of his death is given in a letter of the younger Pliny to Tacitus (*Epist.* vi. 16). He was stationed at Misenum in command of the fleet when, on Aug. 24, A. D. 79, his attention was directed by his sister to a cloud of very unusual size and shape, which appeared sometimes white and sometimes blackish and spotted. It was afterward discovered that it proceeded from Vesuvius, and was the precursor of the great eruption which destroyed Herculaneum and Pompeii. He immediately went to an eminence near at hand to obtain a closer view of this phenomenon, which shot up to a great height. Desiring to make a fuller examination, he ordered a light vessel to be got ready, and provided himself with tablets to take down his observations. At the solicitation of the mariners of Retina, he went to their assistance, and commanded the ships to be launched to save the inhabitants of other cities upon that coast. Proceeding to the very point of danger, he dictated observations upon the phenomena and attendant terrors of the scene. So close did he come to the mountain, that there rained upon his ships a storm of pumice stone, pieces of burning rock, and hot cinders, which kept constantly falling thicker. Moreover, the sudden retreat of the sea left them in danger of falling aground. In this emergency the pilot advised him to return; but Pliny, remembering the maxim of Terence that fortune favors the brave, ordered the steersman to carry him to Pomponianus, who was at Stabiæ. The latter was about to set sail in the greatest consternation; but Pliny, in order to quiet his apprehensions, ordered a bath to be got ready for himself, and partook of his supper with apparent unconcern, assuring his friends that the flames, to which the darkness of the night gave a terrific appearance, arose from the burning of the villages which the peasants had abandoned. He then retired to rest and slept soundly; but the court of the house was filling so fast with cinders, that he was aroused and joined his friends, who were in doubt whether to remain in the house, which was now continually rocking violently from side to side, or to trust themselves to the fields. They decided upon the latter course, tying upon their heads pillows to protect themselves from the storm of stones and cinders. It was now day, but the profound darkness was relieved only by the light of the torches. Going to the shore, they found the sea too tempestuous to embark, and Pliny lay down upon a sail spread out for him. A strong smell of sulphur, the forerunner of approaching flames, obliged the friends to retire; but no sooner had Pliny's slaves raised him from his recumbent position than he fell down dead, suffocated, according to the generally received theory, by some noxious vapors, for he had naturally weak lungs; according to another theory ("Transactions of the American Academy of Arts and Sciences," new series, vol. vi.), from apoplexy following unusual exertion or excitement, or possibly from a fatal crisis in some disease of the heart previously existing. Three days afterward his body was found, bearing no marks of violence.—Pliny was one of the most industrious of writers. As an instance of the economical use of his time, his nephew relates that when once his reader did not pronounce a word correctly, some one present told him to repeat it. Pliny, asking the person whether he had understood it before, and receiving an affirmative answer, said: "Why then would you make him go back again? We have lost by this interruption about ten lines." In Rome he always rode in a chariot to save time, and once blamed his nephew for walking so much, inasmuch as he thus wasted much time which might be profitably spent in study. So great a mass of information had he collected by this course, that while he was procurator of Spain he was offered for his materials 400,000 sesterces by Largius Licinius. He bequeathed to his nephew 160 volumes of *Electorum Commentarii*, written extremely fine on both sides. The only work of his extant is the *Historia Naturalis*, in 37 books, which embraces astronomy, meteorology, geography, mineralogy, zoology, botany, and medicine, beside treating of painting and statuary. The number of authors quoted in this work amounts to between 400 and 500, and the number of volumes to about 2,000. "He was," says Cuvier, "an author without critical judgment, who, after having spent a great deal of time in making extracts, has arranged them under certain chapters, to which he has added reflections, which have no relation to science properly so called, but display alternately either the most superstitious credulity, or the declamations of a discontented philosophy, which finds fault continually with mankind, with nature, and with the gods themselves." There have been many editions of his work, the first of which was published at Venice in 1469. Among the others may be mentioned those of Hardouin (5 vols. 4to., Paris, 1685); Lemaire (10 vols. 8vo., Paris, 1827–'33); Panckoucke (20 vols., Paris, 1829–'33); and Sillig (5 vols. 12mo., Leipsic, 1831–'6). It has been translated into English, German, French, Spanish, Italian, Dutch, and Arabic. An English translation was published by Philemon Holland (London, 1601), and there is another by Dr. Bostock and H. T. Riley in Bohn's "Classical Library" (6 vols., London, 1855). II. THE YOUNGER (CAIUS PLINIUS CÆCILIUS SECUNDUS), a Roman author, nephew of the preceding, born probably in Comum in 61 or 62, died about 116. He studied rhetoric at Rome under Nicetes Sacerdos and Quintilian. He composed at the age of 14 a Greek tragedy. In his 19th year he spoke frequently in the forum, and afterward was employed to plead causes before the courts of the centumviri and the senate. After serving in Syria as a military tribune, he was made quæstor Cæsaris, prætor about A. D. 93, consul in 100, and in 103 proprætor of the province of Pontica, where he remained nearly two years. He was also curator of the channel and banks of the Tiber, and it would seem from his epistles that he also attained the rank of senator. He and his friend, the historian Tacitus, were considered the two most learned men of their time. His only extant works are the *Panegyricus*, written upon his appointment to the consulship in 100, and which has been severely criticized for its fulsome praise of Trajan; and his *Epistolæ* in 10 books. The first 9 books of the latter are addressed to various individuals, but the 10th, which is most important, is taken up with the correspondence between Pliny and Trajan. In this book occurs the celebrated letter in regard to the early Christians, in which he characterizes their religion as a "perverse and extravagant superstition," and the reply of the emperor, which shows him to have been the more enlightened man of the two. The first edition of the *Epistolæ* is that of Venice (4to., 1471), as well as the first of the *Panegyricus* and *Epistolæ* together (8vo., 1508). Among the best editions of both works may be mentioned that of J. M. Gesner, by G. H. Schäfer (Leipsic, 1805), which contains a life of Pliny by Cellarius, and that of Gierig (2 vols. 8vo., Leipsic, 1806). The edition of the *Epistolæ* by Cortius and Longolius (4to., Amsterdam, 1734) is said to be the best. A life of Pliny, more elaborate than that of Cellarius, has been written by Masson (8vo., Amsterdam, 1709). There have been two English translations of the *Epistolæ*, one by Lord Orrery, the other by Melmoth.

PLIOCENE (Gr. *πλειων*, more, and *καινος*, recent), in geology, one of the tertiary groups as arranged by Lyell, so named because the plurality of its fossil shells belong to recent species. The term post-pliocene is applied by Lyell to those more recent groups in which no extinct species of fossil shells are found, but which are below those that contain relics of man. (See GEOLOGY.)

PLOCK, a government of Russian Poland, bounded N. E. by Augustowo, S. and S. W. by the Bug and the Vistula, which separate it from Lublin and Warsaw, and N. by Prussia; area about 6,000 sq. m.; pop. 570,000. It consists of parts of the old palatinates of Masovia and Plock and of the territory of Dobrzyn. Beside the Vistula and Bug it is watered by the Narew, Wkra, Drewenz, and other rivers. The soil is level and fertile. The capital, Plock, on the Vistula, is one of the oldest towns of Poland; pop. 11,000.

PLOTINUS, a philosopher of the Neo-Platonic school, born in Lycopolis, Egypt, about A. D. 204, died at Puteoli in 262. At the age of 28, having a great desire to learn philosophy, he went to Alexandria, and attended the lectures of Ammonius Saccas, the founder of the eclectic school, with whom he remained 11 years. When in 242 the emperor Gordian undertook his expedition against the Persians, Plotinus accompanied the army with the intention of studying the philosophy of the East; but on the death of the monarch he barely escaped with his life to Antioch. In his 40th year he went to Rome, and there taught the doctrines of his master Ammonius, but only orally, as he had agreed to keep them secret; and although his fellow pupils, Herennius and Origen, began to publish them, he did not follow their example until the first year of the reign of Gallienus. When 10 years later Porphyry became his scholar, he had written 21 books, and at the instigation of the latter subsequently composed 24 more, to which after the return of Porphyry to Sicily he added 9. In Rome he remained until his death, and was a great favorite not only with men of science, but with senators and statesmen; and so great confidence was reposed in him, that many Romans on their death beds intrusted him with the guardianship of their children and of their estates. So much attached to him was the emperor Gallienus, that had it not been for the efforts of some of the courtiers he would have rebuilt two cities in Campania for the purpose of allowing Plotinus an opportunity of founding a commonwealth, which should be modelled after the ideal republic of Plato. He died from an accumulation of disorders at the country house of a friend. Plotinus never corrected nor read through a second time his manuscript, and paid no attention to spelling or the division of syllables. His handwriting was so execrable that, owing to a weakness in his eyes, he could scarcely read it himself; and as his thoughts were put down as they occurred and without any systematic connection, he is one of the most obscure writers to be found in any language. So conscious was he himself of this fault, that he chose his pupil Porphyry to revise his productions. These are in 54 books, called the Enneads, and treat of the most abstract subjects of thought, such as "Entity and Unity," "The Essence of the Soul," and "The Unity of the Good." According to his biographer, so ashamed was he that he existed in the body, that he would neither reveal his parentage, his ancestry, his native country, nor even his birthday. When an effort was made to have his portrait drawn, he answered: "Is it not enough to drag after us whithersoever we go that image in which nature has shut us up? Do you think that we should likewise transmit to future ages an image of that image as a sight worthy of their attention?" So great indeed was his contempt for the body, that he had no concern in regard to his health, and was very scanty in the use of food, generally refraining altogether from eating meat. Although his writings are obscure, they have exercised considerable influence upon modern philosophy, having been diligently studied by Cudworth, Henry More, Norris, Gale, and others. There is moreover a striking resemblance between the doctrines of Plotinus and the pantheistic ideas of Spinoza, evinced in the treatise of the former written to show that all being is one and the sense. His life, written by his most illustrious disciple, Porphyry, is the only authority upon his history. The Enneads were first translated into Latin by Marsilius Ficinus (Florence, 1492). In 1835 the entire Greek text was first published by Creuzer (3 vols. 4to., Oxford). The "Select Works of Plotinus" (London, 1834) have been translated into English by Thomas Taylor; and a French version of the Enneads by M. Bouillet was completed in 1861 (3 vols. 8vo., Paris).

PLOUGH, an instrument for breaking up, turning over, mixing, or loosening the soil, drawn by horses, mules, or oxen, and guided by a man who follows behind, holding the plough by the handles. Steam power has also been recently applied to ploughs. The plough of the ancient Egyptians was altogether of wood, a single crooked *stick* serving for the tail, which, extending below the point at which the horizontal beam was secured to it, formed the point or share, which was forced into the ground as the animals attached to the beam drew it forward. The share was stiffened by a rope which passed up from it to the beam, and the handle was divided so as to present a hold for each hand of the ploughman. A horizontal stick also connected the two handles by which the plough might be guided. Wilkinson thinks it probable that the point was shod with a metal sock either of bronze or iron. In the Old Testament metallic ploughshares are alluded to more than 7 centuries B. C.: "They shall beat their swords into ploughshares." (Isa. ii. 4; Micah iv. 3.) In the time of Hesiod two sorts of ploughs were in use among the Greeks. One was formed of a limb of a tree having two opposite branches diverging like the arms of an anchor from its shank. The main stem served as the beam or pole by which the plough was drawn; one arm, sometimes shod with iron or bronze, entered the ground, and by the other the implement was pressed into the ground and guided. The other was constructed of three sticks secured together by nails; one was the beam, which at its lower end was joined to the nearly horizontal share, and from this proceeded the tail or handle. The ploughs now used in Greece must be nearly or quite as simple as the ancient Egyptian plough, being made of two curved pieces of wood, one longer than the other. The long piece forms the beam, and to its lower end is secured the other stick in such a manner that one end of it passes up for a handle and the other end projects a foot or more forward of the lower end of the beam, forming the share, which is iron-shod. The share is braced by a cross bar connecting with a beam above. Virgil (Georgics, i. 169, 170) describes how the limbs of the elm may be caused by continual pressure to grow into the form of the crooked plough. In his time earth or mould boards were in use, attached to each side of the share, from which they rose bending outwardly, so as to turn to each side the soil as it was broken and loosened by the share. In some of the old Roman ploughs the colter was also introduced, being a sort of knife depending from the beam for the purpose of cutting through the soil and roots in advance of the share. Small wheels at the forward end of the beam were in use about the time of Pliny; they serve to prevent the share from entering too deeply into the ground. Among the aborigines of North and South America the plough appears to have been almost entirely unknown. The Peruvians, who were the most skilled in agriculture, employed, as described by Prescott, a rude substitute constructed of a strong, sharp-pointed stake, traversed by a horizontal piece 10 or 12 inches from the point, on which the ploughman might set his foot and force it into the ground. Six or eight strong men were attached by ropes to the stake and dragged it forcibly along, accompanied by women, who followed to break up the sods with their rakes.—Until the middle of the 18th century wrought iron was used for the parts of the plough that entered the ground, each part being rudely forged by itself with no little labor. Cast iron mouldboards were first substituted for those of wrought iron about the year 1740 by James Small, a Scotchman; in 1785 Robert Ransom of Ipswich, Eng., patented the cast iron share; and before 1790 the "land side," or that portion of the plough forming the side opposite to the mouldboard, was also made of cast iron, thus completing all the wearing parts in this material. In the United States a cast iron plough was patented in 1797 by Charles Newbold of New Jersey, and as early as 1800 such ploughs were in use near New York city, having a share and mouldboard in two parts. The construction of the mouldboard engaged in 1798 the attention of Thomas Jefferson, who wrote an elaborate article on the subject. In 1804 David Peacock obtained a patent for a plough having the mouldboard and land side of cast iron and separate, while the share was of wrought iron edged with steel. In 1818 a patent was granted to Richard B. Chenaworth of Baltimore for a plough having the 3 parts, mouldboard, land side, and share, all distinct and of cast iron. Several other patents of similar character were granted previous to the year 1820. In the most approved ploughs now in use, of the breaking-up class, the mouldboard is made of plate steel, its external surface concave and corresponding in its curve to the segment of a cylinder, of which, however, it would comprise but a small portion. Affixed to the plough with the proper obliquity, mouldboards of this character are said to turn the sod more completely and with much less friction than those of any other form. They are made separate from the share, which is also of steel or of cast iron hardened by chilling, and upon the front of this rises the colter, instead of being attached as in most ploughs to the beam a little distance ahead of the share. The breaking-up ploughs are the most important of the several sorts of this implement. They are made of many sizes adapted to the soil to be broken up, and may be drawn by one small horse, or require the full strength of 4 strong horses to carry them through the hardest gravelly soils. The depth to which they penetrate is regulated, as in other ploughs, by the contrivance at the end of the beam called the clevis, to which the draught chain is attached. This is a sort of rack or elongated iron staple, into which the chain is hooked, high up for deep ploughing, and lower down if the ploughing is to be shallow. The greatest depth reached by those of the largest size is about 18 inches, and the width of the furrow about 24. As the breaking-up ploughs are run through soil of some tenacity, as prairie or grass lands, the furrow is regularly laid flat over to one side; and as the plough comes round again another adjoining slice is laid against the former one; and so the work goes on till the whole field is covered with the long overturned slices of earth and sod laid flat or slightly lapped at different angles on each other, as the nature of the soil may require; in stiff clayey soils an angle of about 45° is best. Side-hill ploughs are breaking-up ploughs with the mouldboard so arranged that, after running through the furrow along the side of a hill, it may be instantly shifted round and secured on the other side of the plough. By this contrivance the plough may pass directly back and turn the next furrow down the slope of the hill against the one which preceded it. Another modification of the breaking-up plough is presented in the double mouldboard plough, which is designed for turning two furrows at once in opposite directions—a very expeditious mode of breaking up the ground for ditching. This class of ploughs is again modified in the variety known as the skim or Michigan plough. This has in the usual place of the colter under the beam a miniature plough, with its share and mouldboard. This, running near the surface, takes off the sod in advance of the deeper ploughing, and thus, it is found, materially diminishes the amount of draught required to do the whole work at once. Most of the modified forms of mouldboards, ploughshares, &c., are introduced with the special object of reducing the friction to a minimum and thereby lessening the amount of horse power. The beams and handles of ploughs are for the sake of lightness generally preferred of wood, though some are still made in the manner much in vogue a few years ago, especially in England, entirely of iron. Some double or triple ploughs are constructed so as to cut 2 or 3 furrows at once. The ploughs are secured in a frame at such distances apart as to turn all the ground over which they pass, leaving no untouched places. They are adapted only to light soils, and penetrate to no great depth. By reducing the size of the plough bodies and increasing their number, the implement becomes the cultivator, which is made to cut at once a number of parallel shallow furrows. For merely stirring and loosening the soil to produce the effect of hoeing, ploughs of great simplicity are in use, which are not very different from some of the ploughs of the ancient Greeks and Egyptians. One class of these, known as bull-tongue ploughs, are largely used in the southern cotton and corn fields. The share is pod-shaped, and is driven through the ground with the convex surface forward. Other ploughs specially designed for southern use, and largely supplied like the preceding from northern manufactories, are known as the rice trenching plough, the scooter plough, the cotton scraper, &c. The cheapest breaking-up ploughs for this trade are sold in New York at only $1.85 each, and the heaviest of them for cotton fields cost only $4.50. The cost of ploughs of this class for sugar cultivation varies from $4.50 to $16. The most powerful breaking-up ploughs are made for $[illegible]. Subsoil ploughs are designed not to turn up the surface, but to loosen the soil below the depth ordinarily reached in ploughing, for the purpose of admitting a freer circulation of air and moisture under and about the roots of the plants. The ploughshare, long and slender, is strongly secured to the lower end of an iron bar like a colter, which extends downward from the end of the beam to the required depth. This bar cuts through the soil without disturbing it at the surface, while below it is shaken and lifted by the passage of the share.—A form of plough called the potato plough has of late come into use for digging potatoes. In the place of the mouldboard iron bars, set about 2 inches apart, extend back 1½ or 2 feet from the share on both sides, rising up toward the plough tail. As this machine is run under the potato hills it lifts up the tubers and throws them to the surface, while the earth falls back on each side and through the bars. A trench plough of great power, invented by Mr. A. B. Allen of New York, was put in use in 1861, designed to break up and intimately mix the subsoil and surface soil to the depth of 2 to 3 feet, especially for vineyards, nurseries, plantations of forest trees, and the cultivation of crops which require a deep tilth. It is drawn forward by a strong wire rope connected with a horse whim or capstan; this is firmly secured on the border of the piece of ground to be ploughed, and is moved along this border on the completion of every half dozen furrows or thereabout.—In Sept. 1859, a practical test was made of the steam plough of Mr. Joseph W. Fawkes of Lancaster co., Penn., at the fair grounds of the Illinois state agricultural society at Freeport, Ill., and it was recommended by the committee that the first prize of $3,000 be awarded to him for its satisfactory operation. One great obstacle in the working of very heavy ploughing machines is the necessity of passing over wet and boggy places in which the wheels of the machine sink and the whole becomes immovable. To guard against this liability, Mr. Fawkes made the weight to be borne by a hollow cylinder of wood 6 feet long and 6 feet in diameter, which is set under the platform on which the engine and upright boiler are fixed. This cylinder being made to revolve acts as a driving wheel, carrying all the machinery along with it. In front of the drum is the fire box, and behind it is the water tank. In the extreme front are two iron guide wheels 3½ feet in diameter and 15 inches broad, making a steering truck, which is turned by a wheel on the platform above in charge of the engineer. The engine is of 50 horse power, and its weight with 12 barrels of water and fuel 10 tons. Its entire length is about 18 feet. The ploughs, 8 in number, are attached to a frame, which is suspended by chains passing over grooved pulleys in two beams or davits that project backward from the platform of the engine. The chains pass forward to a windlass by which the fireman may raise the whole gang up from the ground or let them down. The frame of ploughs is drawn along by other chains passing under the platform. In operation it was found that an acre could be ploughed in 12 minutes. "A strip of land 240 yards long and 20 feet wide was ploughed in 4 minutes; and the headlands of 50 feet were crossed, one in 27 seconds, the other in 30, the ploughs being elevated and lowered in the time." Its daily capacity was considered equal to ploughing 25 to 40 acres, and at an expense on the smaller amount accomplished of 64½ cents an acre, allowing for consumption of one ton of bituminous coal and one cord of wood $9, labor of 3 men $4, oil $1, wear and tear $2, and interest (10 per cent. on $4,000) $1.12. The ordinary price for prairie breaking is $2.50 per acre.—The highly cultivated soils of England are especially well suited for steam ploughing, and considerable success has attended the trials of the several methods there attempted. In some of these methods the engine moves through the field dragging the ploughs after it; in others the ploughs are under the engine platform, to which they are firmly attached; and in others the engine is stationary and draws the ploughs by wire ropes passed around drums on the engine and through pulleys secured at a distance. In 1856 Mr. Boydell exhibited at Chelmsford an engine of 8 horse power for drawing ploughs, which weighed with the water it carried 9 tons, and moved upon a portable track in pieces like an endless chain, which the wheels themselves laid, and, after turning on them, raised up to be again laid down in front. The machine was steered by a truck of two small wheels in front. It was reported capable of drawing 10 ploughs in light land at 6 inches depth at the rate of 3 miles an hour; but the ploughs are said to have been little larger than cultivators or grubbers, and the engine was unable to overcome with them any little ascent. A number of machines having the engine and ploughs all attached to the same frame have been exhibited in England. In one of these (Cousin's), described in the "Mechanics' Magazine," vol. lxix. p. 26 (1858), a series of ploughshares and mouldboards are arranged on diagonal lines proceeding from the front corners of the frame, and each of these ploughs has projecting in front of its share an Archimedean screw, which being made to revolve in the ground aids to draw the machine along while it also loosens the soil before the plough. Mr. H. M. Platt of New York has also patented a revolving screw share, which takes the place of the ordinary share, and by its revolution lifts and completely cuts up and pulverizes the furrow. Several patents have been granted in England to Mr. John Fowler, and prizes also (one of 500 sovereigns in 1859) have been awarded for his methods of ploughing by means of one or two steam engines. In the former case the engine, having two upright drums or capstans, is set at a point in the field which may be called the apex of the triangular space occupied by the apparatus. At each of the other angles is set a guide pulley through which a strong wire rope passes from one of the drums to the other, and to this rope between the pulleys the ploughs are attached. By the movement of the engine the rope is first wound around one of the drums and unwound from the other, and, the furrow being run through, the motion is reversed and the ploughs are run back in the other direction. Eight and even 12 ploughs have been worked on the single rope, half of them pointing in one direction and the other half in the other. They are attached to a frame which is balanced upon the axle of a carriage, and is moved up and down like a see-saw. The guide pulleys are moved as required to reach the unploughed portion of the field. In the use of two engines, one was placed at each end of the furrow and an endless wire rope was employed, which was passed several times around the drum of each engine, and thus the ploughs between them were drawn in either direction by their joint action. They were held in place by being attached to low trucks loaded with earth, and having thin sharp wheels which penetrated into the ground. These were easily moved along the margin across the ends of the furrows as the ploughing proceeded, but were not readily drawn sidewise from their places. For accounts of other steam ploughs, see the "Mechanics' Magazine" for 1856 and 1857.

PLOVER, the common name of the *charadriinæ*, a large group of wading birds, very generally distributed over the world. They have a moderately long and slender bill, with culmen depressed at the base but vaulted at the tip, much as in the pigeons; sides compressed, and in the groove are placed the nostrils; wings long and pointed; tail moderate, broad, and generally even; tarsi usually long and rather slender; the outer and middle toes more or less united at the base, the hind toe wanting or very small; claws compressed and curved; the head is very large, the neck short and thick, and the folded wings reach beyond the tail. The genus *vanellus* (Linn.) has been described under LAPWING.—In the genus *charadrius* (Linn.) the bill is shorter than the head, strong and straight; the 1st quill the longest;

hind toe wanting. The prevailing color is yellowish gray, spotted; the tail transversely banded; no collar on the neck; tarsi and lower thighs uniformly reticulated; legs bluish green. They are usually seen in small flocks near the sea, in the summer often going inland; the food consists of small insects, mollusks, worms, and berries, and is usually sought in the evening or at night; they are strong and rapid fliers, though for short distances, and fast runners; the note is a plaintive whistle easily imitated, as sportsmen well know; the nest is a slight hollow in the sand, lined with dried grass, and the eggs, commonly 4, are placed with the small ends together; the young leave the nest as soon as hatched; if disturbed on or near the nest, the parent birds use various devices to lead the intruder from it, pretending lameness or inability to fly. The golden plover (*C. Virginicus*, Borck.) is about 10½ inches in length and 22½ in alar extent; in the male the upper parts are brownish black, with numerous spots of golden yellow, on the upper tail coverts generally assuming the form of transverse bands; entire under parts in the breeding season black with a brownish bronzed lustre; bill black. After the autumnal moult the black of the under parts gives place to light grayish with darker spots and streaks. It is found all over North America, and in South America, N. Asia, and Europe; it is called bullhead and field plover; it breeds in the north, going south in winter. It very much resembles the European golden plover (*C. pluvialis*, Linn.), except that the axillaries in the latter are white instead of ashy; the eggs are said to be delicious, as also are the young and old birds. The dotterel of Europe (*C. morinellus*, Linn.), very common, is blackish ash with a white band behind the eyes and another above the breast; breast and flanks reddish brown, and end of tail white. Boie separated from *charadrius* the genus *ægialitis*, comprising several smaller species, with lighter and uniform unspotted plumage, with neck and head generally banded with dark, and without continuous black on the abdomen. The 5 following plovers belong to this genus of Boie. The kildeer (*C. vociferus*, Linn.) has been noticed under that title. Wilson's plover (*C. Wilsonius*, Ord) is about 7¼ inches long and 14½ in alar extent; bill 1 inch, robust; entire under plumage, forehead, and stripe over eye, white; band of black above the white one on forehead; wide transverse band on breast brownish black; upper parts light ashy brown; a ring of white around the back of neck; bill black and legs yellow. In the female there is not the black on the forehead, and the pectoral band is reddish and ashy brown. It is found on the Atlantic coast of the middle and southern states and in Brazil; it is a constant resident in the south, and breeds there, sometimes going as far north as Long island; the breeding season commences about June 1; the eggs are 1¼ by 1 inch, dull cream-colored, with a few pale purple dots and dark brown spots; it is very plump in autumn, and is excellent for the table; it feeds both by night and day. The ring plover (*C. semipalmatus*, Bonap.) is a little smaller than the last, light ashy brown above, tinged with olive; under parts, front, throat, and ring around the neck, white; a black band across the breast, extending around the back of the neck below the white ring; bill orange, black-tipped, and legs yellow; female similar, but lighter; young without the black frontal band, and the pectoral band ashy brown. It is found throughout temperate North America, and is common on the Atlantic coast; it breeds in the north, in Labrador about June 1, in rocky mossy districts in the interior; the nest is a cavity in the moss, sheltered from the north winds and exposed to the sun, near the pools formed by the melting snow; it goes south about the middle of August; the flesh of the young birds is juicy and tender; it associates with other birds of similar habits, and is not at all shy. The piping plover (*C. melodus*, Ord) is about as large as the last, but of a much lighter brown, almost ashy, the feathers with a whitish edging; there is no black band from the bill through and under the eye; the white collar around neck, and the black frontal and pectoral bands less, the latter usually not meeting in front; rump and upper tail coverts almost white; tail white at base, tipped with black. It is found throughout eastern North America, as far as Nebraska occasionally, and in the southern states; it breeds all along the sandy coasts from Labrador to Florida; it rarely goes far inland, and does not frequent rocky or muddy places. It is a very rapid flier and runner, and is so nearly the color of the sand on which it squats close when alarmed that it is hard to detect. The notes are very soft and mellow, approaching those of a song bird, whence its name. It is seldom pursued by sportsmen, on account of its small size, though its flesh is very delicate and savory. The European ring plover (*C. hiaticula*, Linn.) so nearly resembles the *C. semipalmatus* of America as to be with difficulty distinguished from it. There are about 40 other species of the genus *charadrius*.—In the genus *squatarola* (Cuv.) the bill is nearly as long as the head, strong and straight; tail long, broad, and rounded; hind toe very small, not touching the ground. Two species are described, found in both hemispheres, migrating from the temperate to arctic and antarctic regions, where they pass the warmer months; they frequent river margins and marshes as well as the sea shore, running with rapidity and uttering at the same time a shrill piping whistle; the food consists of worms, slugs, and various insects; the nest is a slight hollow in the ground lined with dry grass. The black-bellied plover (*S. Helvetica*, Cuv.) is the largest of the American birds of this group, having a length of about 12 inches. Most of the lower parts, the front of the neck, and around the tase of the bill to the eyes, are black; above white, nearly pure on the forehead, barred with brownish black on the back and tail, and tinged with ashy on the sides; abdomen, under tail coverts, and tibiæ white; quills brownish black; bill and legs black. In winter the plumage is dark brown above, spotted with white and yellow, and white below, with dark brown lines and spots on the breast. It is widely distributed over America, and along the sea coasts of most parts of the world; it migrates chiefly by night, resting and feeding by day; it is very shy except in the breeding season, which is the same as to time as in the other species. The name plover, applied to the various birds of this group, is a corruption of the French *pluvier*, derived from the fact that their flocks are in the habit of migrating during the rainy season in autumn.—The bird called the upland or field plover is Bartram's sandpiper, belonging to the sub-family *totaninæ*, and is the *actiturus Bartramius* (Bonap.), or *tringa Bartramia* (Wils.). This bird is 12 inches long; the bill is not longer than the head, curved at the tip, the cleft extending nearly to the eyes; the upper mandible is grooved for ⅔ of its length, and the feathers extend on it further than on the lower; wings and legs long; tarsus longer than middle toe; outer toe most webbed; tail more than half the wing, graduated. The general color is brownish black above with a greenish lustre, the feathers edged with ashy white and yellow; lateral tail coverts yellowish white, with black arrowheads; wide stripe over eye and under parts pale yellowish white, nearly pure white on abdomen, with brownish black lines on the neck; legs light yellow. This is the most terrestrial of the family, frequenting as its name imports the upland dry places, sometimes in the neighborhood of and at others far removed from the sea. It is spread over eastern North America, South America, and Europe, very abundant in the interior of the Atlantic states, preferring plains and cultivated fields; it is one of the few species which have not decreased with extended cultivation. It passes the winter in the vast prairies of the south-west, going in spring and summer as far north even as the Saskatchewan, returning in the autumn; it is seen in large and small flocks, and sometimes in pairs; it is very wary, a swift flier, and a rapid runner; the notes are plaintive and mellow; the food consists of beetles, grasshoppers, crickets, seeds, and berries; it is fat and juicy in the autumn, and excellent eating; the habits are the same as in the true plovers, which, though ranked among waders, rarely enter the water except on the very edge of the sea and ponds.

PLOWDEN, EDMUND, an English lawyer, born about 1517, died in 1584. He studied at Cambridge and Oxford, and in 1552 was admitted to practise physic and surgery. He then studied the common law, according to Wood; but Plowden in the preface to his "Commentaries" says that he began the study of the law in the 20th year of his age. In 1557 and 1560 he was reader, or lecturer, of the Middle Temple, and at the end of the reign of Queen Mary was made sergeant at law. He wrote "Commentaries or Reports of Divers Cases in the Reigns of Edward VI., Mary, and Elizabeth" (London, 1571, 1578, 1599, 1613, and 1816), and "Queries, or a Moot-Book of Cases, translated, methodized, and enlarged" (8vo., London, 1662). His works are regarded as the most accurate and authoritative of the old reports.

PLUM, a hardy fruit, which originated from the bullace (*prunus insititia*, Linn.), a variety of the sloe (*P. spinosa*, Linn.), and from the *P. domestica* of Linnæus. The sloe is a large, spiny shrub, or small scrubby tree with a clear stem 3 to 4 feet high; its bark is black, whence it is termed black thorn; its leaves dark green; its flowers solitary, white; the stamens, 20 to 30, have orange anthers; the style 1 or sometimes 2; the fruit a globose black drupe covered with a beautiful blue bloom when ripe. It is a native of S. Russia, the Caucasus, and the banks of the Volga, but has spread into other parts of the world. It belongs to the natural order *drupaceæ*. (See PEACH.) The bullace has spiny branches, flowers in pairs, ovate or lanceolate leaves, and roundish fruit.—The domestic plum (*P. domestica*) has spineless branches, mostly solitary flowers, lanceolate leaves, grows 16 to 20 feet high, and shows a resemblance to the sloe, though larger in all its parts. The original species and its two principal varieties have a wide geographical range, extending from Norway to Barbary, and from Portugal to Cashmere and even Nepaul. Damascus was formerly celebrated for this fruit, and the many kinds known as damsons probably originally came from there. The cherry plum or myrobalan has a handsome red globose fruit, which is depressed at base; its nut is furnished with a small point. It is a very interesting fruit, and may be regarded as the first remove from the bullace. The myrobalan is spoken of favorably as an ornamental tree, deserving a place in gardens on account of its early flowering. The apricot-like plum has the appearance of an intermediate state between the wild apricot and the wild plum; it is regarded however as a sub-variety of the domestic plum. The finer kinds of garden plums are found to vary greatly from each other in the size of foliage, earlier or later blossoming, size and shape of the fruits, and in the smoothness or downiness as well as vigor of their young shoots. The number of approved kinds, according to the latest English catalogues, is 274; the best American authorities reduce that number considerably. A large number of choice sorts have originated in the United States, and some of great size and beauty of fruit. Those known as the Lombard, red gage, golden drop, &c., with all the damsons, bear fruit well in sandy soils; while the Smith's Orleans, Washington, Duane's purple, &c., seem suited to a northern climate; and the imperial gage, Coe's golden drop, and Huling's superb are better suited to a southern. In this country the garden plums are usually propagated by sowing the nuts or stones of any free-growing kinds, and budding them with the choicer sorts when they are two years old. The seedlings of the Mirabelle plum are used when dwarf trees are wanted. The plum will grow well in almost any soil, but with some exceptions heavy loams and earths abounding in clay seem best. Muck from salt water marshes and from docks has been found very serviceable. Common salt promotes the health and luxuriance of the garden plum, and is disagreeable to insects which infest it.—The plum is liable to a singular disease, known as the black wart, which, seizing upon the young branches, ends by destroying them. From some examination we are led to think that its origin is in the too great tendency in some soils to make fruit buds, and an inadequate supply of inorganic materials in the soil to ripen and perfect the wood. This tendency causes a tumid swelling of the tender tissues, which is mistaken by the plum weevil for the fruit, stinging which to deposit its eggs only aggravates the evil; after a while the bark bursts and cracks, and a small but gregarious fungus (*sphæria morbosa*, Fries) appears upon the surface and finishes the work. The plum weevil alluded to is the *rhynchænus nenuphar* (Harris), a small coleopterous insect, which pierces the young fruits as soon as they are set, and causes them to prematurely fall, so that valuable crops are thus annually lost. The best preventive discovered is shaking the trees daily for a few weeks and catching the beetles in outspread sheets, when they must be killed. The fallen plums should be also carefully gathered up and burned.—The chief uses of the plum are for dessert and for preserving in sirups. In France several distinct sorts are raised expressly to manufacture into a sort of dried preserve called *brignoles*. The fruits are not gathered until the sun has dried off the dews; the trees are slightly shaken so that only the ripest may fall into cloths laid under them for the purpose; they are then spread in shallow baskets, which are kept in a cool and dry place. The next day the skin is removed without the use of any iron instrument, which would spoil their color, when they are dried in the sun on wooden sieves or wicker frames, after which they are threaded at the tip on little rods so as not to touch each other, and hung up to dry in the sun and air until every particle of moisture appears to be evaporated; the stones are then removed and the shape of the plum restored. After a second careful drying in the sun they are arranged in little round flat boxes and are ready for sale.—The best prunes are made of the variety known as the St. Catharine plum and the *prune d'Agen*. After being exposed in the air for several days till they have become soft, they are shut up close in spent ovens and left for 24 hours; they are then taken out and replaced after the ovens have been slightly reheated. On the next day they are taken out and turned by slightly shaking the sieves on which they have been laid. The ovens are heated again, and they are put in a third time; and after remaining 24 hours they are taken out and left to get quite cold. After some manipulation they are submitted to oven heat twice more, and then put loosely into small, long, and rather deep boxes for sale. From the bruised pulp of plums and from the kernels fermented with honey and flour, and the mass subjected to distillation, an excellent spirit is obtained in the south of France.—The sloe and bullace have both become naturalized in the United States. Four native species are also known to our flora. The Chickasaw plum (*P. Chickasa*, Mx.) is a shrub or small tree, with thin, lanceolate, acute, smooth, sharply serrate, glandular-toothed leaves; short-peduncled flowers; smooth calyx, and a yellowish red globose drupe, of ½ inch diameter, thin-skinned, and of an agreeable flavor. It is found in old fields and thickets in the southern states, but probably is only native to the country west of the Mississippi river. The wild yellow or red plum (*P. Americana*, Marshall) is a bushy tree 8 to 20 feet high, with ovate or somewhat obovate, conspicuously pointed or doubly serrate, very veiny leaves; the fruit roundish oval, ¾ inch in diameter, with a turgid stone; the skin is tough and acid, but the pulp is of a pleasant taste. This species has a wide range, along banks of streams in Canada to Georgia and Texas. It has been introduced into cultivation, and has undergone some modifications in the form and structure of its fruit. The beach plum (*P. maritima*, Wangenheim) is a low shrub with straggling branches and subject to several forms; its fruit is often an inch in diameter and pleasant to the taste, but sometimes astringent. It is peculiar to sandy coasts, ranging from Massachusetts to New Jersey; and in the variety with smaller red or purplish fruit, it reaches to Virginia and Alabama. The *P. glandulosa* (Hooker) has been noticed in Texas by Drummond, having a stem less than one foot high and very crooked thorny branches, small oval, obtuse leaves, and umbels of 1 or 2 flowers, but with unknown fruit. Some other species of plums have been described by Thunberg and others as natives of Japan, China, &c., but little is known regarding them.—The wood of the plum, especially of the wild species, is hard, and bears a polish, but is apt to crack, and fit chiefly for handles to tools and for walking sticks. The spiny branches of the sloe are used for dead hedges and to protect the stems of valuable trees from cattle. Its leaves dried make a substitute for tea, and all kinds of domestic animals are fond of them; the bark is used as a febrifuge, and the fruit is styptic; the bark also has been used in tanning; a decoction of it in alkali dyes yellow, and in sulphate of iron it forms a beautiful black ink; its unripe fruit has been pickled as a substitute for olives, but the flowers are purgative. The gum of the common plum tree resembles tragacanth.

PLUMB LINE, or PLUMMET (Lat. *plumbum*, lead), an instrument consisting of a weight, usually of lead, hanging to a string, used by artificers and others to fix vertical lines, or more correctly those in the direction of terrestrial gravity. This instrument was in use by the ancients, and is referred to in the books of Amos, vii. 7, 8, and Isaiah, xxviii. 17. One limb of a carpenter's square being set in a vertical position by a plumb line attached to it, the other limb must be horizontal; and so the instrument may serve to determine horizontal as well as vertical lines. By means of a quadrant scale between the two legs of the square and a plumb line suspended from the central point of junction, angles of inclination of the surface upon which the instrument stands from the horizontal or vertical may be read. In surveying and astronomical instruments the plumb line is sometimes used as a means of fixing and regulating their position, but the spirit level is generally employed instead.

PLUMBAGO. See GRAPHITE.

PLUMER, WILLIAM, an American politician, governor of New Hampshire, born in Newbury, Mass., June 25, 1759, died in Epping, N. H., Dec. 22, 1850. When he was only 8 years of age his family removed to Epping, and in that place he lived until his death. He was admitted to the bar in 1787, became speedily successful as a lawyer, and for many years took an active part in the political movements of New Hampshire. He was 8 times elected a representative to the state legislature, of which he was speaker for two years, and subsequently he was a member and for two years president of the state senate. In 1792 he was one of the delegates to the convention for revising the constitution of the state, in the proceedings of which body he bore a prominent part. In 1802 he was elected to the U. S. senate, and in 1812, 1816, 1817, and 1818 was chosen governor of New Hampshire. In 1820 he was a presidential elector, which was the last public office he filled, as from this time he devoted himself to literary pursuits. He contributed largely to the periodical press, but otherwise published little, although he left many manuscripts.—A life of Gov. Plumer has been written by his son, William Plumer, jr., and edited by the Rev. A. P. Peabody, D.D. (8vo., Boston, 1856).

PLUNKET, WILLIAM CONYNGHAM, baron, an Irish lawyer, born in Enniskillen in July, 1764, died Jan. 4, 1854. He was the second son of a Presbyterian minister, who removed to Dublin while William was still young, and dying soon afterward left his family to the care of his congregation. William was graduated at Trinity college, Dublin, obtained a scholarship, entered Lincoln's Inn in 1784, and was called to the Irish bar in 1787. His professional progress was slow, but he became king's counsel in 1798. When the rebellion broke out he gave professional aid to the patriots, and was publicly accused of being an associate in their proceedings, but the charge was disproved. He entered the Irish parliament in 1798 as member for Charlemont. He opposed the legislative union with England in 1800, and his speeches in the debates on that measure raised him to the first rank of his party; they also greatly increased his practice at the bar, to which he returned when the union was accomplished. In 1803 he was made solicitor-general for Ireland, and on the outbreak of Emmet's rebellion was selected by the crown as one of the lawyers for the prosecution. His speech on that occasion exposed him to much obloquy, and to the abuse of Cobbett, whom he successfully prosecuted upon a libel suit. In 1805 he was made, by Pitt, attorney-general for Ireland, and was continued in that position under Lord Grenville. He held a seat in parliament during the same period, and made several able speeches in favor of Catholic emancipation. On the dissolution of the ministry in 1807, he retired, but in 1812 reëntered parliament as member for Trinity college. He was again made attorney-general for Ireland in 1822, and one of his first official acts was to prosecute a large number of Orangemen for riot. Made master of the rolls in England in 1827, he was compelled through the jealousy of the English bar to abandon the office, and soon after was elevated to the post of chief justice of the common pleas in Ireland, and was ennobled. In 1830 he was appointed lord chancellor of Ireland, and held the office, except for a brief interval, until 1841, when he finally retired to private life.

PLUSH (Fr. *peluche*), a textile fabric distinguished by its velvet nap or shag on one side. It may be entirely of worsted, or of cotton, or silk; but it is usually composed of a woof of a single woollen thread and a twofold warp, the one wool of two threads twisted, the other goats' or camels' hair. As the hair warp is raised by one treadle and the woollen warp is depressed by the other two treadles, the woof is passed between. Afterward the hair warp is cut with a fine-pointed knife, thus producing the velvety appearance. Plush is especially a French manufacture, though it was long since made by the English and Dutch.

PLUTARCH, a Greek biographer and philosopher, born in Chæronea in Bœotia. The little that is known of his life has been collected chiefly from his own works. He was studying philosophy under Ammonius at Delphi when Nero visited Greece in A. D. 66. He also visited several parts of Italy, and remained for some time at Rome, where he lectured during the reign of Domitian. It is probable that he spent the later years of his life at Chæronea, where he says that he wrote the life of Demosthenes. Here he discharged the duties of a magistrate, and was also a priest of Apollo. He was married to a lady of his native city named Timoxena, and had 5 children, to one of whom, Lamprias, is attributed the catalogue of his productions. The statement of Suidas that Plutarch was the preceptor of Trajan is probably unfounded. Of the time and manner of his death we have no knowledge, although it is certain that he lived to an advanced age. Fabricius conjectured that he died when 70 years old, in the reign of Hadrian. The great work of Plutarch is his "Parallel Lives." In this he writes a biography of a Greek and of a Roman, and then makes a comparison between the two, although in some cases the comparisons are now lost. There are 46 of these lives extant. The other works ascribed to him, numbering about 60, are ranged together under the general title of *Moralia*, but 11 of them are on historical subjects. Some of these essays were probably not written by Plutarch. His "Lives" he himself preferred to his other works. The first edition of the "Lives" in the Greek text appeared at Florence in 1517, and the latest and best is that of C. Sintenis (4 vols. 8vo., Leipsic, 1839–'46). Of the numerous translations of the work, the excellent French one of Amyot was rendered into English by Sir Thomas North in 1612. Dryden's translation is really the work of other hands, the poet himself having written scarcely any thing but the dedication to the duke of Ormond, and the life of Plutarch. There is another English translation by John and William Langhorne. A revision of Dryden's has been edited by Arthur Hugh Clough (5 vols. 8vo., Boston, 1860). The first edition of the *Moralia*, very incorrect, was that of the elder Aldus (fol., Venice, 1509). The best is that of Wyttenbach (8 vols. 4to., Oxford, 1795–1821). It has been translated into French by Amyot, into German by Kaltwasser, and into English by Howard (London, 1603). The first edition of the complete works is that of H. Stephens (13 vols. 8vo., Geneva, 1572).

PLUTO, in ancient mythology, the god of the lower world, usually known in Greek mythology as Hades. He was a son of Saturn and Rhea, and was brother of Jupiter and Neptune; and when the world was divided among the three, he obtained for his share "the darkness of night." His wife, called by the Greeks Persephone and by the Romans Proserpine, was the daughter of Ceres, and was violently carried from the upper world. Of all the gods, he was the most hated of mortals, and his temple and statues do not seem to have been numerous. In Homer he is always called Hades, but among the later Greek writers that term came generally to be applied to the abode of the dead itself. By the Roman poets Dis, Orcus, and Tartarus are used as synonymous with Pluto.

PLUTUS (called also Pluton), in ancient mythology, the god of wealth. He was the son of Jasion and Ceres, and is said to have been blinded by Jupiter so that he might distribute his gifts without regard to merit, he having previously granted them to the good exclusively. When coming to mortals he is slow-footed and lame, when going from them swift-winged. He appears to have been usually represented as a boy with a cornucopia.

PLYMOUTH. I. A S. E. co. of Mass., bordered E. by Massachusetts bay, and S. partly by Buzzard's bay, and watered by Taunton and North rivers; area estimated at 700 sq. m.; pop. in 1860, 66,784. Its soil is not fertile. The agricultural productions in 1855 were 139,617 bushels of Indian corn, 231,865 of potatoes, 19,948 tons of hay, 8,628 lbs. of wool, and 399,878 of butter. The coasting trade and fisheries occupy much of the industry of the county. In 1855 there were 18 vessels of 3,519 tons engaged in the whale fishery, and the receipts of oil were: whale, 45,108 galls., value $33,831; sperm, 108,756 galls., value $188,291. The mackerel and cod fishery employed 96 vessels of 7,368 tons, returning 12,555 barrels of mackerel, and 39,792 quintals of codfish. There were 5 cotton mills, 20 forges, 23 rolling, slitting, and nail mills, 18 furnaces for hollow ware and castings, 12 tack and brad factories, and 33 establishments for the manufacture of rail cars, coaches, and other vehicles. In 1858 there were 127 churches and 6 newspaper offices. The Old Colony and Cape Cod railroads, beside branches, give the county extensive communication with the large cities of New England. Capital, Plymouth. II. A N. W. co. of Iowa, bounded W. by the Sioux river, and intersected by Floyd river; area estimated at 850 sq. m.; pop. in 1859, 112; productions in 1859, 400 bushels of wheat, 865 of oats, 11,125 of Indian corn, 2,625 of potatoes, and 317 tons of hay.

PLYMOUTH, the shire town of Plymouth co., Mass., 37½ m. S. E. from Boston by the Old Colony railroad; pop. in 1860, 6,274. The township is one of the largest in the state in point of area, extending on the coast about 16 m. from N. to S. Plymouth village is situated at the N. end of the township, and is compactly built, chiefly of wood. It is a port of entry, and the harbor is formed partly by a beach 3 m. long, which extends N. and S. and protects it from the waters of Massachusetts bay. The harbor is large, but shallow. A considerable number of trading and fishing vessels are owned here. The manufactures of the town are of more importance than the coasting and fishing trade. They consist of cotton goods, as cloth, duck, and thread; iron ware, as hoops, nails, rivets; cordage, of which the factories are extensive; sails, boots and shoes, articles of clothing, &c. The most noted edifice is Pilgrim hall on Court street, built in 1824–'5, which contains a large hall and curiosities relating to the pilgrims of the Mayflower and other early settlers of Massachusetts, together with historical paintings, and portraits of distinguished citizens. Among the antiquities is a chair that belonged to Gov. Carver, the sword of Capt. Miles Standish, and a variety of aboriginal weapons and implements.—Plymouth is the oldest town in New England. The pilgrim fathers landed here Dec. 11, 1620, O. S., on a granite bowlder lying on the shore, near which it has been proposed to erect a monument, the corner stone of which was laid Aug. 1, 1859.

PLYMOUTH, a fortified seaport of Devonshire, England, situated at the head of the sound of the same name, on the river Plym, 220 m. W. S. W. from London; pop. in 1871, 52,221. Taken in its widest sense, the name comprehends what are called the "Three Towns," viz., Plymouth, Devonport, and Stonehouse. Plymouth proper is a very thriving and handsome town, covering about 1 sq. m. of ground. The royal hotel is an extensive structure with a theatre and assembly rooms attached, erected by the corporation of the town at a cost of £60,000. In the Cottonian public library there are many rare and valuable works, a large collection of MSS., paintings, drawings, &c. The place owes its celebrity to its fine harbor and dockyard. (See DEVONPORT.) It is supplied with water brought from Dartmoor by a channel 24 m. long. The manufactures, with the exception of those connected with the naval establishments, are of little importance. The fisheries are very productive.—Plymouth was a place of some importance in 1438. The British fleet rendezvoused here at the time of the threatened invasion of the Spanish armada; and the port equipped 7 ships and a fly boat as its share of the fleet. It sided with the parliament against Charles I., and was several times unsuccessfully besieged by the royal forces. It returns 2 members to parliament.

PLYMOUTH BRETHREN, a Christian denomination which arose a little more than 30 years ago in Great Britain. Among its early prominent leaders was John Darby, an Anglican clergyman, after whom the members of the denomination on the continent of Europe have frequently been called Darbyites. From a doubt as to the apostolic succession in the church of England, Darby proceeded to reject altogether the idea of a still legally existing Christian church, and maintained that Christians of like opinions should gather together in small bands to prepare for the second advent of the Lord, which Darby hoped he would live to see. The Brethren have no written creed or confession, and every one is allowed entire freedom of belief; yet they hold the total depravity of man, the necessity of regeneration by the Holy Spirit, and the atonement by the sufferings and death of Christ. They reject all special designation or ordination to the office of the ministry, but regard all true Christians as priests, who, if they are found able to edify the brethren, are authorized to preach and administer the sacraments without any human call or ordination. As a body, they practise adult baptism only; they do not make it a condition of membership, yet generally succeed in convincing their members of the importance of being rebaptized. Their worship consists simply in adoration, praise, and thanksgiving to God. They partake of the Lord's supper every Sunday morning, and believers only are expected to meet then. In the afternoon or evening of the Lord's day they preach to such as are not yet converted.—The Plymouth Brethren spread first through Great Britain, and particularly in the town of Plymouth, where they gained perhaps 1,500 believers; hence the name. They soon became divided into three parties. At the head of one of them was Darby; at the head of a second Newton, whose peculiar doctrines respecting the person of Christ were generally repudiated by the denomination as heretical, and afterward retracted by the author. Among the other congregations which refused to be involved in the bitter personal controversies between Newton and Darby, the Bethesda congregation of Bristol was prominent. The leader of this congregation, George Müller, is the author of the well known autobiographical work, "The Lord's Dealings with George Müller," republished in America, with an introduction by Dr. Wayland, under the title of "A Life of Trust" (Boston, 1861). Notwithstanding their internal divisions, the Plymouth Brethren have of late been making great progress in Great Britain, and in 1860 a revivalist of some note, the Rev. Mr. Guinness, was baptized by one of their leading men, Lord Congleton. In 1850 they had 132 places of worship, which number, we believe, has since been considerably increased. At present gatherings of them exist, varying from a small number to many hundreds, in most of the cities and large towns of England, Scotland, and Ireland, also in remote country districts and villages.—Darby was induced in 1838, by the opposition which he met in England, to remove to Switzerland. He gathered a number of adherents in almost every town of the canton of Vaud, and in several towns of Geneva and Bern. A French periodical, *Le témoignage des disciples de la parole* (afterward called *Études scripturaires*), was started for the propagation of their tenets, and a kind of seminary established for training missionaries. They suffered some losses from the political revolution in the canton of Vaud in 1845, and later from the organization of a free reformed church; yet they still have congregations in most of the towns of Vaud, of which the most numerous are those of Lausanne and Vevey. From Switzerland they spread into France, where they have congregations in Paris, Lyons, Marseilles, and a number of other places. They have been still more successful in Italy since 1848, where nearly all the numerous so called free evangelical associations, under the leadership of Dr. De Sanctis, Professor Mazzarella of Bologna, Count Guicciardini, and others, have adopted their principles to a greater or less extent. A few scattered congregations are found in Germany, at Cape Colony, in Australia, New Zealand, and Canada. They made their appearance also in the East Indies, where Bishop Wilson of Calcutta published a pastoral letter against them. In the United States there are gatherings in Philadelphia and various other places. Here also dissensions have shown themselves; in Philadelphia, for example, there is a second meeting, not recognized by the others, on account of holding views on the non-eternity of future punishment which the Brethren generally consider heretical. A full account of the dissensions among the Plymouth Brethren of England is given by Estéoule, *Le Plymouthisme d'autrefois et le Darbyisme d'aujourd'hui* (Paris, 1858). The best, though very brief, sketch of their origin, rise, and progress, of their present condition and principles, and of the literary productions of the denomination, may be found in Mrs. H. Grattan Guinness's "Answer to the Question: Who are the Plymouth Brethren?" (Philadelphia, 1861).

PLYMOUTH SOUND, a large inlet of the English channel, situated about 12 m. N. N. E. from the Eddystone lighthouse, 3 m. wide at the entrance, and extending inland about the same distance to the town of Plymouth. The coast is generally rocky and abrupt, and the rocky island of St. Nicholas rises out of the water at its head, near the N. shore. On the W. side is Cawsand bay; and further up in the N. W. corner of the sound is the estuary of the Tamar, which is called Hamoaze, and forms the harbor for the ships of war. The estuary of the Plym or Laira forms another harbor, which is called Catwater; it is capable of containing 1,000 sail of ordinary vessels, and is generally used as a harbor for merchant ships and transports. The Catwater opens into the N. E. corner of the sound, and is not so deep as Hamoaze. There are both wet and dry docks connected with it. Sutton pool is a tide harbor, also used by merchant vessels; and a pier at Mill Bay accommodates the largest steamships at all states of the tide. The harbor of Hamoaze is 4 m. long, has moorings for nearly 100 sail of the line, and 15 fathoms of water at ebb tide. An extensive breakwater protects the sound against gales from the southward. (See BREAKWATER.)

PNEUMATICS (Gr. πνεῦμα, wind, air), that branch of general mechanics which treats of the equilibrium and motion of elastic or aëriform fluids, *i. e.*, of gases and vapors. Many portions of this subject being embraced and treated under special topics, as ATMOSPHERE, BALLOON, BAROMETER, DIVING BELL, WINDS, &c., a statement of the general theory only, with such applications as are not elsewhere made, will here be in place. The fact that air is material, and of course that all similar bodies are so, as truly and in the same sense as water or iron, is one that requires to be admitted and kept in view from the outset. It may be mentioned, in illustration of the materiality of air and other gases, that in running, swinging the hand, or standing in a wind, we become sensible of the contact of the air. Any one attempting to run, drawing after him an open umbrella, with the concave side toward him, will become convinced that, however imperceptibly air glides out of our way in our ordinary movements, making room without apparent resistance, it is in reality a material mass, possessing considerable density, having the property of inertia in common with all matter, and actually opposing resistance to all efforts which directly tend to impart motion to it. Many gases, as the air, are permanent, preserving their gaseous form under all degrees of temperature or compression to which they have yet been subjected. Other gases, as chlorine and ammonia, are by the agency of cold and pressure caused to change their state, becoming liquids or solids, and for the time, of course, losing the peculiar properties of the aëriform condition; these are non-permanent gases. By like agencies, all vapors proper are made to return to the liquid form. As ordinarily understood, pneumatics treats of the action only of bodies in the form of the permanent gases, of which common air is conveniently taken as the representative; and vapors in the perfect or "dry" state, as invisible steam, before condensation has begun to charge them with moisture and diminish their expansive force, as well as the liquefiable gases when above their point of liquefaction, belong to the same class, and follow the same laws. But the principles of this science can be so extended as to investigate the elasticity and action of the vapors and non-permanent gases, through all stages of condensation, down to the liquid condition. Unless when otherwise stated, the principles which follow will relate to the permanent gases only, air being taken as the common type.—The distinguishing characters of these bodies grow out of the facts that their molecules do not sensibly cohere, but can move with perfect freedom both about and away from each other; and that between these molecules there exist repulsive forces greatly exceeding any forces of attraction that may act, causing them at all times to strive to recede from each other, and with considerable energy. From these circumstances it follows: 1, that all gases can be compressed, or if allowed will expand, and so far as yet known, in the case of perfect gases, these results take place to an indefinite extent; 2, that, when compressed, a perfect gas will always exert a pressure in the contrary direction, or against the compressing force, thus manifesting the peculiar form of elasticity possessed by these bodies, or what is called their expansive force, and the measure or amount of which for a given case is termed the tension of the gas or vapor; 3, that, wherever a gas or vapor is found to exist as a body, having appreciable density, this is invariably the result of some confining pressure applied to it from without, and compelling its particles into a certain degree of proximity; 4, that when a body of gas is kept from expanding, this is because the pressure from without equals and balances its tension at the time; and 5, that when a body of gas is at rest throughout all its parts, this is because, at every point within it, the various pressures exerted in different directions are in equilibrium. The difference ween liquids and gases in the last respect is, in a body of the former, at rest, there is uilibrium at every point between an applied essure by weight or otherwise, and reaction an incompressible mass; but in the gas the uilibrium is between an applied pressure and e repulsive force or tension from within. eat, increasing this repulsion, augments the nsion; and unless a correspondingly greater ternal pressure is then brought to bear, the uilibrium is destroyed. If this take place at point within the gaseous body, the result is a inging or current; if exerted throughout its tire volume, the pushing out of the enclosing rriers by expansion. Illustrations of these nciples are numerous. If a little air only be rfectly enclosed in an India rubber bag, and at continuously applied, the tension and volume the enclosed air are so increased as to swell , or even to burst the bag. The same results y be secured in a precisely opposite way, by acing the bag, prepared as before, in the reiver of the air pump, and gradually exhaustg, *i. e.*, reducing the density and tension of e confined atmosphere about the bag; the mpressing force on the enclosed air being us lessened, the tension of this body of air in excess, and expansion follows, going on till this tension is so lowered as to equal the m of the outer pressure and the cohesion of e rubber, or until the latter gives way. So, e atmosphere is a confined and compressed dy of air, gravitation holding and squeezing down to a stratum of moderate depth, over e earth's whole surface. But in any body gas so situated, though rigidly under this nfining pressure, the particles will still posss complete freedom of motion about each her; and any diminution or increase of presre at points within the mass will be followed currents, such as winds; in other words, twithstanding any degree of compression om without, such a body is still perfectly uid. Now, the fundamental laws of the rest d motion of liquids are consequences, not of eir property of liquidity, but of their fluidity. ence, with such modifications as are required the want of cohesion in the gases, their mpressibility and expansive force, all the laws hydromechanics become strictly true also for riform bodies—the same principles which perate in the ocean (of water) or in the essel of water, also having place in the aërial cean or in the enclosed volume of perfect apor. Among these may be named: 1, hat equal pressures in every direction are erted upon and by every point in a gaseus body at rest; 2, that a pressure made on confined body of gas, as in a liquid mass, perfectly transmitted in every direction, and the atmosphere to great distances; 3, that ch pressure is proportional to the area of surce receiving it, and so multiplied when the ceiving surface is larger than that communiting it; 4, that pressure on a given surface a given depth, due to weight, is calculated in a similar way; 5, that the free surface of any such body, as the upper aërial surface, tends to a level at any place; and 6, that within any body of gas, at any given depth, there is exerted a supporting *or* buoyant power, which is as the density or tension of the gas at the place. The difference in the two sets of cases is, that while liquids balance by simple pressures, gases and vapors always balance by their tensions. Even the hydrostatic paradox finds its counterpart in the case of gases; any quantity of the latter, however small, balancing any other quantity, however great, so long as the tensions of the two are equal. Thus it is that, so long as the elasticity of the included equals that of the surrounding air, the vast mass of the atmosphere does not overbalance the minute body of air in the lungs, nor the still less collections of air distributed through our tissues, and so act upon these as to compress them and destroy the organs. And the whole mechanical operation of breathing is simply a flux and reflux of so much air as will restore the equality of tensions, or equilibrium, of the air within and without the lungs; such equilibrium, however, being, under nervous and muscular action, as often disturbed again by enlargement and diminution of the cavity of the thorax. Man is permeated by his atmosphere, and like all animals fitted to exist only in a stratum extending between certain limits of density. If he ascends from ordinary levels to the height of 2 or 3 miles, the outer tension becomes deficient, and the fluids of the body rupture their enclosing vessels outward; if he descends to great depths, the outer tension preponderates, and the air cells of the lungs or other membranes are burst inward, or the pressure causes congestion within the unyielding walls of the cranium. So, upon explosion of the large amount of powder in a mill or magazine, the superincumbent air being lifted upward, that in the vicinity is rarefied, and houses situated in this portion, if closed, often have their windows burst outward by expansion of the air within them. Air could be substituted for water in the hydrostatic press, and with the same gain of power, were it not that its compressibility enables the load as well as the power to descend upon it, so that a part of the work is lost in producing compression.—Aristotle asserted that air has weight, and suggested, though in an impracticable form (the use of a bladder of air), the experiment by which this truth was finally established. Many subsequent writers supposed in a general way that air is heavy, and thus explained such facts as the difficulty of raising the piston of a syringe when air is not allowed to enter it. Galileo still more clearly conceived of the air as a ponderable mass, and proceeded to adduce some of the hydrostatical principles already referred to. Torricelli proved the weight and pressure of the air, and measured its amount, in the experiment which led to the construction of the barometer (1643); and Pascal confirmed these results by showing that at heights above the ordinary level the mercurial column supported by the air is shorter (1647). The weight of a column of air resting on a horizontal square inch, at the sea level, is, at an average temperature, very nearly 14.6 lbs.; and a pressure of this amount is conveniently termed a pressure of one atmosphere. The first pneumatic law, investigated by Boyle in 1650, and by Mariotte in 1676, and known as Mariotte's law, affirms that, at a given temperature, the volume of an aëriform body at rest is inversely as the compressing force. Direct consequences are, that the density and the tension are proportional to the compressing force. The second great law of tension and pressure is that of Dalton and Gay-Lussac (1801), by both of whom it was independently discovered, according to which, when the tension of a gas or vapor is constant, the density diminishes as the increase of temperature; in other words, for equal increments of temperature, a gas or perfect vapor expands by the same fraction of its own bulk; this being $\frac{1}{480}$ of its volume at 32° F., and for each degree above that point, or about $\frac{3}{8}$ of its volume between 32° and 212°. Amontons compounded the ratios given by these two laws, obtaining a third, which expresses the relation of tension to temperature, when the density is constant. Professor Potter (1858) adds a fourth, an empirical law, for cases in which the quantity of heat remains constant; namely, that in any sudden condensation or rarefaction, the difference of temperature varies as the cube of the rarefaction. Of air, or any other permanent gas, the tension remains unimpaired under compressing force applied for any length of time. It was found, however, not long after the announcement of the laws of Mariotte and Dalton, that vapors and nonpermanent gases undergo compression in a ratio greater than that of the increase of pressure upon them, and that near the point of condensation this deviation becomes very great. More recently, Mariotte's law has been found to need still further qualifications. Despretz (1829) announced that carbonic acid, ammonia, cyanogen, and some other gases, undergo at all temperatures a compression more rapid than that of the increase of pressure, and in a ratio uniformly increasing; while above 14 atmospheres the result with hydrogen was the opposite. Regnault has confirmed these results, and has even shown a deviation from the law in the case of a confined body of pure air. He obtained, for instance, a 10 and 20 fold density of air by applying respectively 9.9 and 19.7 atmospheres of pressure; of carbonic acid, by 9.2 and 16.7 atmospheres; of hydrogen, by 10.05 and 20.26. The slightly different results since obtained by Natterer are regarded as less trustworthy. It follows that Mariotte's law is to be accepted as but approximately true, the variations being different for different gases; but the deviation, especially in air, is so slight, that for ordinary determinations of the volume of gases, and in the use of air in manometers or pressure gauges, it may be overlooked. Such gauges are of two kinds, according as the intention is to estimate rarefaction or increased density in a confined body of air, steam, &c.; the former being called vacuum gauges, the latter condensing gauges. Essentially, the simple manometer, in either form, is but a tube, straight or bent, containing a column of mercury, the space at one extremity of which is in communication with the enclosed gas or vapor. Above the other extremity, if the object be to measure rarefaction, the atmosphere is allowed to press, or a vacuum is left; rarefying the enclosed body, the column of mercury falls by reason of diminishing support or preponderance of the outer air, and the amount of descent shows, on a prepared scale by the side of the tube, the degree of rarefaction. The straight vertical column of mercury supported by the atmosphere, being about 30 inches in height, a descent of 1 inch shows the subtraction of $\frac{1}{30}$ of the density and tension of common air; and this quantity is conveniently spoken of as "1 inch of pressure," or "1 inch of mercury," half the atmospheric tension being 15 inches of pressure, and so on. In the condensing gauge, the confined body of air in the outer end of the bent tube is of course compressed to half its volume, that is, in a uniform tube, to half its length, when the tension within the engine or apparatus is 2 atmospheres; to one fourth, when it is 4 atmospheres; and so for any number of parts, as shown by a scale. The earth's atmosphere being subject to compression by its own weight, it results, as stated more at length in the article ATMOSPHERE, that at heights in it increasing in an arithmetical ratio, the density and tension diminish in a geometrical ratio. Now, all the relations expressed in Mariotte's law and its consequences are conveniently exhibited in a table like the following; and by including the last column, that of heights, the 0 of heights being the sea level, and the height 1 denoting that experimentally found as 2.705 miles, all the relations in the first 4 columns become represented as they exist theoretically, and very nearly actually, in our atmosphere:

Pressures.	Densities.	Tensions.	Volumes.	Heights, in the air.
1	1	1	1	0
1/2	1/2	1/2	2	1
1/4	1/4	1/4	4	2
1/8	1/8	1/8	8	3
1/16	1/16	1/16	16	4
...	...	...	...	..
1/1024	1/1024	1/1024	1024	10
&c.	&c.	&c.	&c.	&c.

In the atmosphere, however, other causes of slight deviation from the relation of density to height exist. Among these are: 1, that the earth's attraction diminishes somewhat, about $\frac{1}{2000}$ part for each mile near the earth, at points taken in ascending through the atmosphere; 2, that the attractions of the sun and moon at some times and places conspire with, at others

pose, the action of the earth; 3, variations
e to changing temperatures; 4, admixture
vapors, &c., in the lower atmosphere. The
neral effect is a slightly more rapid diminu-
n of density than that above given, with
crease of altitude. Exemplifications of the
nets of equilibrium, and of disturbance of
uilibrium in bodies of gas or vapor, and of
e relations of tension to volume expressed
Mariotte's law, are numerous, and in view
these principles very readily understood.
hus, upon the large tanks inverted and dip-
ng beneath in water, called gasometers, em-
oyed at gas works for containing the illumi-
ting gases to be distributed, any increase of
essure is applied, this pressure is speedily
t throughout the bodies of the fluid filling
e mains and service pipes, branching in all
rections and miles in length, and from the
ousands of burners in which these pipes ter-
inate the gas jets with increased velocity and
lume. The action commonly called suction
is in all cases purely mechanical. Performed
y the mouth, the air in its cavity is first partly
pelled, and the cheeks dilated, while ingress
f more air through the mouth and nostrils is
revented; hence, the body of air included
ithin the mouth, and between it and the sur-
ce to which the suction is applied, or, in case
f raising a liquid, that also in the tube reach-
g from the mouth to the liquid, is considera-
y rarefied; its tension diminishes in propor-
on, the external air preponderates, and the
rface or liquid is impelled toward the mouth;
it be a liquid, by repeating the operation, a
ntinued flow, though not to a greater eleva-
n than about 32 feet, is secured. With this
ew and explanation that of the common
mp is identical. In the exhausting syringe,
tight piston ascending through a cylinder,
hich is below in communication with a con-
ed body of air, enlarges the space presented
the air, and this expands to fill the whole
ace; by the action of valves opening out-
ard, the portion entering the cylinder is ex-
lled. The air pump, in its most perfect con-
uction, is no more than such an exhausting
ringe, in a form and with additions securing
e greatest convenience of use. The pro-
ss of cupping depends on the pressure of the
ernal atmosphere, which forces a portion of
e fluids of the body, chiefly blood, into the
rtial vacuum in certain ways secured in the
pping glass. The siphon, the pneumatic ink-
and, and the pneumatic bracket, alike be-
me serviceable through the pressure of the
r. The balloon is rendered practicable by
e equal upward pressure, or buoyancy, which
fluid, experiencing at any given depth a cer-
in downward pressure (in this case, its
eight), must exert. The numerous instruc-
ve or amusing experiments made with the
r pump, including that one so famous in the
story of the sciences, because so efficient in
lightening the public mind in regard to the
eat truth of atmospheric pressure, namely,
that of the Magdeburg hemispheres, are all but illustrations of, and very obviously explained by, principles such as those now presented. In Hero's fountain, a condensation of air going on by the influx of water into one vessel, is made by increase of tension to cause a jet of water from another vessel with which the former communicates. The action of the bellows, of fan wheels and blowing machines, for furnaces, ventilation, &c., may be understood upon simple pneumatic principles; and the phenomenon of intermitting springs is supposed to be due to the presence of a siphon-shaped conduit leading from a cavity within elevated ground to the point at which the spring emerges. The phenomena of natural circulation of air through mines by means of two upright shafts of unequal length, hence containing atmospheric columns which, through difference of temperature within the shafts, are of unequal weight, as well as the draught of chimneys, ventilation in all its forms, the land and sea breezes, and indeed all winds, are obvious examples of currents due to a disturbance of the atmospheric equilibrium at given places. The causes leading to such disturbance, in the latter cases, are considered under METEOROLOGY.—Aëro-dynamic problems, or those investigating the flow and delivery of gases through orifices, in tubes, and in currents, and the consequences of the impact and momentum of moving air, are of too intricate a character to be presented fully except in special treatises on the subject. Torricelli's principle for liquids, that the velocity of discharge from an orifice is that which the body of liquid would acquire in falling freely from the height of its surface to the orifice, applies quite as strictly to gases as to liquids. Now, a heavy body, in falling through one foot, acquires a velocity of 8 feet per second; and the velocities of discharge being as the square roots of the depths, and the height of the surface of a homogeneous atmosphere above the sea level being 27,720 feet, it follows that, at the latter level, the velocity with which air should jet into a vacuum through an opening not too small, will equal nearly the product $8\sqrt{27,720}=1,332$ feet. Experiments show that the actual velocity, as in the case of water, is somewhat less; that for orifices in a thin wall it is about 65 per cent. of that named; for short cylindrical spouts, .93; and for conical, narrowing outward, .94. These facts correspond in a degree with the results in spouting liquids, and show that, as well as in these, the "contracted vein" exists in the efflux of gases. The movement of gases through pipes is also subject to retardation similar to that affecting the delivery of liquids; and roughness of the inside of tubes, sharp angles, inequalities of size, &c., here also increase the amount of retardation. This retarded flow has proved, unexpectedly, a chief difficulty in the way of using the pneumatic power transmitter proposed by Papin—in substance a hydrostatic press containing air, with

a long pipe connecting the two pistons, so as to allow of action at distant points. So, in the case of a blowing tube constructed in Wales to catch the air impelled by a waterfall, and convey it to a distance, in order to feed the blast of a foundery, the time estimated for the delivery of the air being 6 seconds, it was found that the jet of air did not arrive until after the lapse of 10 minutes; and being then but feeble, the plan proved worthless. The remarkable retardation of gases in tubes must be due in a considerable degree to adhesion of the gases to the solid surfaces, a principle well known; and Robison has also supposed much of it due to an undulation arising from this and other causes in the transmitted air. It is well ascertained that, beside varying in the force of horizontal movement, producing gusts, winds also undulate vertically, as do water waves. Moreover, winds are retarded by obvious causes near the surface of the earth, just as a stream of water flows slowly at its bottom; and thus they are always less violent in cities than in the open country. Similar influences must modify their flow at the sides, and above, and especially where winds flow in unlike directions along an aërial plane dividing them.

PNEUMONIA, Peripneumonia, or Lung Fever, inflammation of the proper substance of the lungs. Pneumonia is one of the most frequent forms of inflammation; it is common to all ages, attacking equally the old man and the newly born infant. It prevails more frequently in spring and autumn than in summer and winter, in cold and temperate than in tropical climates. The prolonged exposure to cold is the cause to which it is most frequently attributed, but in many instances careful research cannot assign an exciting cause; it occurs oftenest among the ill fed, the intemperate, and those who suffer from crowding and want of ventilation; consecutive pneumonia, as it is then termed, often arises in the course of typhoid, of typhus, and eruptive fevers. In many cases the patient is feverish and unwell for 3 or 4 days before the actual invasion of the disease; this is almost invariably marked by well defined rigor, followed by pain in the side, cough, accelerated breathing, and fever. The pain in the side, commonly felt beneath the nipple, is no guide to the seat of the disease; it is generally caused by accompanying inflammation of the pleura, is lancinating in character, increased by inspiration and by motion of the thorax; according to Grisolle it occurred in 272 out of 301 patients. Accelerated breathing is an invariable symptom, the respirations varying from 30 to 50 in a minute, though they may be as frequent as 80. The pulse does not increase in the same ratio as the respiration; the ordinary relation of 4½ pulsations to a respiration is disturbed, and is reduced to 3, 2, or even less. Dr. Walshe says he has seen this perverted pulse ratio prove the first sign of pneumonia, appearing before crepitation or rusty expectoration. Cough is an almost invariable symptom, occurring commonly at the commencement of the disease; it is not paroxysmal, and is not aggravated at night. In a great majority of cases the cough is accompanied by expectoration, which is pathognomic of the disease. It is tenacious, semi-transparent, little aërated, and of a lemon, orange, or rust color, according to the amount of blood with which it is combined. When free blood occurs in the expectoration, according to Walshe, the pneumonia is complicated by the presence of tubercles. As the disease subsides the expectoration gradually becomes opaque and bronchial. In some cases, instead of being transparent and viscid, the expectoration is diffluent, watery, and of a dark color resembling prune or licorice juice. This is always a serious symptom. The pulse is most commonly frequent, full, and strong; the skin is hot; during the height of the disease the face is often deeply flushed, sometimes almost livid. The pathognomonic physical sign of the first stage of pneumonia is the crepitant rhonchus; this is fine, dry, equal, and heard chiefly at the end of the inspiration. To distinguish it it is often necessary to make the patient cough. In a short time the crepitant rhonchus is replaced by bronchial respiration; the breathing is loud, blowing, and tubular, and when the patient speaks the voice has the diffused resonance to which the term bronchophony is applied. At the limits of the bronchial respiration, while the inflammation is extending, the crepitant rhonchus is still heard. As bronchial respiration replaces fine crepitation, percussion becomes dull over the affected portion of the lung; at the same time the vibratory thrill felt when the patient speaks, by the hand placed upon the chest, becomes more marked. When pneumonia is central and the inflamed part of the organ is separated from the parietes by healthy lung tissue, both percussion and auscultation may give negative results. When the attack of pneumonia results in recovery, as the general symptoms diminish in intensity and the expectoration becomes white or grayish, the bronchial respiration becomes less strongly marked, and over the parts last attacked a coarser and moister crepitation recurs; this is the redux crepitant rhonchus. With the return of the crepitant rhonchus the percussion note becomes clearer, until gradually the lung recovers its former condition. When on the other hand the attack is fatal, the general symptoms, with the exception of pain, persist and are aggravated; the expectoration becomes of a dirty gray color, striated, and finally perhaps wholly purulent; the complexion grows pale, yellowish, and earthy looking; the skin is covered with a viscid sweat, and death is preceded by the tracheal rhonchus. In general the intelligence remains unimpaired to the last. On post-mortem examination the lungs are found in various stages of inflammation, and frequently the three stages commonly recognized are seen in the same patient. In the first stage of inflammation, engorgement, the lung substance is heavier, of a darker color, does not crepitate when pressed between the fingers, and on being cut into gives exit to a frothy, sero-sanguinolent liquid. In the 2d stage, that of red hepatization, the lung is dark-colored, compact, friable, its tissue being easily broken up by the finger; its substance when cut into, or better when torn, presents a multitude of small rounded granulations. In the 3d stage, gray hepatization, while presenting many of the characteristics of the 2d, the lung tissue is of a gray or yellowish color. At first this grayish color presents itself in scattered points, but these gradually coalesce. The lung is still more friable than before, and is easily broken down into a pulp; on being incised a thick fluid of a disagreeable odor, a mixture of blood, pus, and mucus, escapes. In rare instances abscesses are formed in the lungs as a consequence of pneumonia.—The duration of pneumonia is rarely less than 7 or more than 10 days. Very fatal in young infants and in old people, it is attended with but little danger between the ages of 6 and 50, when uncomplicated and occurring in patients of good constitution. When pneumonia is double, when it is complicated with heart disease, with albuminuria, or with delirium tremens, when it occurs in constitutions deteriorated by fatigue, privations, or excess, its gravity is very greatly increased. It sometimes occurs as an epidemic, and is then a severer disease than when it is sporadic.—But a few years ago not many would have been bold enough to question the curative influence of bloodletting in pneumonia, and yet it is now repudiated altogether by many practitioners of the highest authority. It is certain, however, that in strong, healthy, young adults, a single full bleeding will often relieve the breathing, remove the pain, and diminish the force and frequency of the pulse; in other cases, where the pain in the side is severe, it is best to have recourse to cupping glasses. Afterward small doses of tartrate of antimony combined with morphia may be given every 2 or 3 hours. The patient should be kept in bed, the chest should be covered with an oiled silk jacket, and the diet should be bland but nutritious. Where patients are feeble, broken down, or advanced in years, general bloodletting is inadmissible, and even antimony must be used with great caution. A nutritious diet, and the administration of carbonate of ammonia, and frequently of stimulants, form, in such cases, the appropriate treatment.—Chronic pneumonia, except as an attendant upon tubercle or cancer, is an exceedingly rare affection. In it the lung becomes dry, gray, reddish, or black, indurated, and impermeable to air. It may occur as a primary disease, or may follow an attack of acute pneumonia. The patient gradually loses flesh and strength; there is cough with trifling expectoration and no hæmoptysis, and slight but irregular fever. The physical signs are dulness on percussion over the affected part, with feeble, harsh, or bronchial respiration, and increased vocal fremitus. When it affects the upper lobe of the lung, the diagnosis between chronic pneumonia and phthisis must be exceedingly difficult. The disease is generally a fatal one, and the treatment usually consists in supporting the strength of the patient and allaying the symptoms which may arise during its progress.

PO (anc. *Padus* and *Eridanus*), a river of N. Italy, which has its source in two springs about 6,000 feet above the level of the sea, near lat. 44° 40′ N., long. 7° E., on the E. side of Monte Viso, one of the Cottian Alps, and flows into the Adriatic by a delta, the most important branches of which are the Po della Maestra and Po di Primaro, between lat. 44° 51′ and 45° N., and long. 12° 20′ and 12° 30′ E., after a very circuitous but generally E. course of rather more than 450 m. It receives a great number of tributaries both from the Alps on the N. and the Apennines on the S. The most important of the former are the Dora Riparia, Chisone, Sangone, Dora Baltea, Stura, Sesia, Ticino, Olona, Adda, Oglio, and Mincio; and of the latter the Vraita, Tanaro, Scrivia, Staffora, Trebia, Nura, Taro, Parma, Enza, Secchia, and Panaro. About 50 towns of considerable size are situated on its banks or those of its tributaries, and boats can ascend to within 60 m. of its source, but the current is so rapid as to render navigation difficult. Destructive floods are liable to happen at all seasons from heavy rains, and during the summer months from the melting of snow on the mountains; and the flat country through which the lower part of the river flows renders artificial embankments necessary to confine it to its channel. Below Piacenza dikes have been formed, but extensive inundations occasionally happen. The bed of the Po, like that of the Nile, is being continually raised by the deposits made by the river. This rising of the level of the water renders it necessary to make a corresponding increase in the height of the embankments, and the effect of these operations has been that in many places the surface of the river is from 15 to 20 feet higher than the country through which it flows. The breadth of the bed of the Po from the junction of the Ticino to the formation of the delta varies from 400 to 600 yards, and the depth from 12 to 35 feet. The basin of the Po includes an area of about 40,000 sq. m., and comprises the whole of Piedmont and Lombardy, parts of southern or Italian Tyrol, western Venetia, and the Swiss canton of Ticino, a part of the canton of Grisons, the duchies of Parma and Modena, the territories of Bologna, Ferrara, and Ravenna, and a small part of Tuscany. Fish are abundant in both the main stream and its tributaries, the most valuable kinds being salmon, shad, and sturgeon.

POACHING. See GAME LAWS.

POCAHONTAS. I. A central co. of Va., intersected by Greenbrier river; area, 710 sq.

m.; pop. in 1860, 3,958, of whom 252 were slaves. It has an elevated and mountainous surface, being traversed by the Greenbrier range toward the W., and bounded S. E. by a main range of the Alleghanies. A large portion of the land is infertile. The productions in 1850 were 51,949 bushels of Indian corn, 11,806 of wheat, 52,998 of oats, 5,911 tons of hay, 24,422 lbs. of wool, and 76,080 of butter. There were 7 churches, and 200 pupils attending public schools. Value of real estate in 1856, $1,218,147, being an increase of 27 per cent. since 1850. Capital, Huntersville. II. A N. W. co. of Iowa, drained by Lizard and other small rivers; area, 625 sq. m.; pop. in 1860, 103. It produced in 1859 1,265 bushels of Indian corn, 1,125 of potatoes, and 298 tons of hay.

POCAHONTAS, daughter of Powhatan, an Indian chief of Virginia, born about 1595, died in Gravesend, England, in March, 1617. She was early remarkable for the friendship she manifested for the English colonists of Virginia, a striking evidence of which was given when she was about 12 years old. Capt. John Smith having been taken prisoner, it was decided to put him to death. His head was laid upon a stone, and the savages were brandishing their clubs preparatory to dashing out his brains, when Pocahontas threw herself upon the captive's body, and saved his life. When Smith had returned to Jamestown, he sent presents to Pocahontas and her father; and after this the former "with her wild train visited Jamestown as freely as her father's habitation." In 1609 she passed one dark night through the wood to inform Smith of a plot upon the part of her father to destroy him. In 1612 she was living in the territory of the Indian chief Japazaws, having probably gone thither on account of the resentment of her father at her conduct. Capt. Argall bribed Japazaws to betray her into his hands, and having gained possession of her person began to treat with Powhatan for her restitution, but the parties were unable to agree. While on shipboard, however, an attachment sprang up between her and an Englishman named John Rolfe, and the consent of Sir Thomas Dale and of her father having been gained, they were married at Jamestown in April, 1613. A peace of many years' duration between the English and the Indians was the consequence of this union. Before her marriage she had become a Christian, and had been baptized, receiving the name of Rebecca. In 1616 she accompanied Dale on his return to England, where she was an object of great interest to all classes of people, and was presented at court by Lady Delaware. When Smith went to visit her in London, after saluting him she turned away her face and hid it in her hands, and remained in this position for 2 or 3 hours. For some reason she had been taught to believe that he was dead, and there is but little doubt that her husband was a party to the deception. Pocahontas prepared to leave England with regret, but she suddenly died as she was on the point of embarking. She left one son, who was educated by his uncle, a London merchant, and in after life went to Virginia, where he became a person of note and influence. A number of his descendants still exist in that state.

POCOCK, **Edward**, an English divine and orientalist, born in Oxford in Nov. 1604, died there, Sept. 10, 1691. He was graduated at Oxford in 1622, and turning his attention to the study of the oriental languages, prepared an edition in Syriac of the 2d epistle of St. Peter, the 2d and 3d of St. John, and that of St. Jude, parts of the Syriac New Testament which had not previously been edited. Having been ordained priest in 1629, he went out to Aleppo as chaplain of the English merchants in that city, and there remained 5 or 6 years, studying Hebrew, Syriac, Ethiopic, and Arabic. Returning in 1636, he was appointed first incumbent of the Arabic professorship founded by Laud, by whom he had been commissioned, while in the East, to procure ancient coins and manuscripts. He soon went again to the East at the instance of Laud, remained at Constantinople nearly 4 years, and having obtained many valuable manuscripts, came home in 1640 by way of Italy and France, making at Paris the acquaintance of the celebrated Maronite Gabriel Sionita, and of Hugo Grotius. Resuming his lectures and studies at the university, he was presented in 1643 to the rectory of Childrey in Berkshire; and so little display did he make of his learning that he was characterized by one of his parishioners as "a plain honest man, but no Latiner." In 1647, through the influence of Selden, he obtained the restitution of his salary as Arabic professor for the preceding 3 years, which on the execution of Laud had been withheld from him. Charles I. while a prisoner in the isle of Wight in 1648, nominated him to the professorship of Hebrew with a canonry of Christchurch added; but in Nov. 1650, he was ejected from the latter, and was about to be deprived of the former when a petition from the heads of houses and the masters and scholars at Oxford was so favorably received, that he was permitted to enjoy both places. In 1655 an information was laid against him by the commissioners appointed by parliament "for ejecting ignorant, scandalous, insufficient, and negligent ministers;" and probably he would have been removed from his rectorship had it not been for the indignant remonstrances of many of his Oxford friends, especially Dr. Owen. Some time before he had published *Specimen Historiæ Arabum*, consisting of extracts from Abulfaragius in the Arabic with a Latin translation and notes appended; and in 1655 appeared at Oxford his *Porta Mosis*, which were 6 prefatory discourses to the commentaries of Moses Maimonides upon the Mishna. He had a considerable share in the preparation of Walton's polyglot Bible, which appeared in 1657; and in 1658 he published at Oxford, in 2 vols. 4to., his Latin translation of the "Annals" of Eutychius. At the restoration he was made canon of Christchurch, as the grant was originally, and shortly after published an Arabic version of Grotius's tract *De Veritate*, and an Arabic poem of Abu Ismael Tograi with a Latin translation and notes. His great work, however, was the translation of the *Historia Dynastiarum* of Abulfaragius, with the text and notes (2 vols. 4to., Oxford, 1663). He published in 1674 an Arabic version of the church catechism and liturgy; in 1677 his "Commentary upon the Prophecies of Micah and Malachi," in 1685 that on Hosea, and in 1691 that on Joel. At the time of his death he had long enjoyed the reputation of being the first orientalist in Europe.—Pocock's son, Edward, published in 1671, under his father's direction, the philosophical treatise of Ibn Tofayl, with a Latin version and notes, being the same which was afterward translated into English by Ockley. He also translated into Latin the work of Abdallatif on Egypt, but it was not published until 1800. Another son, Thomas, made an English translation of the work of Menasseh ben Israel, *De Termino Vitæ* (12mo., London, 1699).—An edition of Pocock's theological writings appeared at London in 1740 (2 vols. fol.), with an account of his life and writings by Leonard Twells, M.A.

POCOCKE, Richard, an English traveller, a distant relation of the preceding, born in Southampton in 1704, died in Meath in Sept. 1765. He was graduated at Oxford in 1731. In 1737 he began his travels in the East, and after his return in 1742 published his "Observations on Egypt," the first volume of a work under the general title of "A Description of the East and some other Countries." The second volume, entitled "Observations on Palestine, or the Holy Land, Syria, Mesopotamia, Cyprus, and Candia," appeared in 1745. In the same year he was made archdeacon of Dublin, in 1756 bishop of Ossory, and in 1765 bishop of Meath.

PODIEBRAD, George, king of Bohemia, born in 1420, died March 22, 1471. He was the son of Herant of Podiebrad and Kunstat, a Hussite nobleman. The Hussite war, which was agitating Bohemia during his youth, enlisted all his feelings; but while the Bohemian king and German emperor Sigismund lived he acted with the moderate party. After that monarch's death, the Hussites repudiated the election of Albert of Austria, and chose as their ruler Casimir, brother of Ladislas III., king of Poland. Albert, however, succeeded in driving the Hussites and Poles to Tabor, and began the siege of that fortress; but Podiebrad by a successful sally forced him to raise it, and to retreat to Prague. Among the Hussites he now became second only to Henry Ptacek of Lipa, and after the death of that leader in 1444 he succeeded him as regent during the minority of Ladislas, the son of Albert. For a long time he was engaged in conflicts with Meinhard of Neuhaus, the leader of the Catholics, but in 1450 the Calixtines triumphed, and in 1451 Podiebrad was recognized as ruler by the whole country. His authority was confirmed when the deputies of Hungary, Austria, and Bohemia met in Vienna to agree upon a plan for the government of their respective countries, and the guardianship of the young king Ladislas. After the death of that monarch (1457), Podiebrad was elected king of Bohemia, May 7, 1458, and was crowned in 1461; and in this position he maintained himself both against foreign and domestic enemies. No sooner had he ascended the throne than he banished, according to agreement, the Taborites, Picards, Adamites, and all other religious sects not Catholic. The pope, however, annulled the compacts entered into between the Calixtines and the Catholics, and excommunicated Podiebrad in 1463; but through the mediation of the emperor Frederic the contest was settled for a time. But the new pope, Paul II., deposed Podiebrad, and caused a crusade to be preached against him throughout Germany; and on this account the king of Bohemia in 1468 declared war against the emperor, and ravaged Austria as far as the Danube. The emperor now induced Matthias Corvinus, king of Hungary, to take up arms against Podiebrad, and the Catholics of Bohemia were also excited to insurrection. Podiebrad recalled the exiled heretics, suppressed the domestic insurrection, drove back the Hungarians who had invaded his territory, and negotiated an armistice with Matthias, April 14, 1469. The latter, however, soon broke his agreement, and was chosen king of Bohemia by a mock diet held at Olmütz; but Podiebrad succeeded in having Ladislas, eldest son of Casimir IV., king of Poland, of the house of Jagiello, chosen as his successor. The war continued until an armistice was agreed upon, July 22, 1470; and upon his death in the following year he was succeeded by Ladislas, while his two sons, Victorin and Henry, returned to the position of Bohemian nobles.

PODOLIA, formerly a province of Poland, and now a government of Russia, bounded N. by Volhynia, N. E. by Kiev, E. and S. by Cherson, S. W. by Bessarabia, and W. by Austrian Galicia; extreme length 250 m., breadth 140 m.; area, 16,675 sq. m.; pop. in 1856, 1,750,547. Kamieniec, or Kamenetz Podolskoi, the capital, is the only town of importance. An offset of the Carpathian mountains enters Podolia from Galicia and traverses it in a S. E. direction, but in no part exceeds 600 feet above the sea. The surface in other directions is flat, with a general slope to the S. E. The principal rivers are the Dniester and southern Bug; the former constitutes the S. W. boundary, and the latter rises on the N. frontier, and flows S. E. There are no lakes of any considerable size, but small ones are numerous in the western part. The most valuable minerals are saltpetre, limestone, and alabaster. The climate is mild, and the soil particularly fertile. Different kinds of grain, potatoes, hemp, flax, and tobacco are raised in

The early history of the laureateship in England is traditional. The common story is that Edward III. in 1367, emulating the crowning of Petrarch at Rome, granted the office to Chaucer, with a yearly pension of 100 marks and a tierce of Malvoisie wine. The legend probably arose out of an annuity of 20 marks granted by that monarch to his "valet Geoffrey Chaucer," with the controllership of the wool and petty wine revenues for the port of London, the duties of which he was required to perform in person. There is no evidence even that this laborious office was conferred on the ground of poetical merit. Henry Scogan is mentioned by Ben Jonson as the laureate of Henry IV. John Kay was court poet under Edward IV., and Andrew Bernard held the same office under Henry VII. and Henry VIII. John Skelton received from Oxford, and subsequently from Cambridge, the title of poet laureate; and Spenser is spoken of as the laureate of Queen Elizabeth, on the ground of having received a pension of £50 a year when he presented her the first books of the "Faery Queen." The names of Samuel Daniel and Michael Drayton were also associated with the laureateship, although the latter "was one of the poets," says Southey, "to whom the title of laureate was given in that age, not as holding the office, but as a mark of honor to which they were entitled." Up to this time the laureateship had not been established, nor can there be found any certain trace of wine or wages. But the introduction into England from Italy of masques during the reign of Elizabeth rendered necessary the employment of poets, and in 1619 James I., probably to save expense, secured the services of Ben Jonson by granting him by patent an annuity for life of 100 marks. Although not mentioned in the document as the laureate, he was doubtless deemed such. In 1630 the laureateship was made a patent office in the gift of the lord chamberlain, the salary was increased from 100 marks to £100, and a tierce of Canary wine was added, which, however, was commuted in the time of Southey for £27 a year. From that time until the present there has been a regular succession of laureates. The following is a list of those who have held the office, with the dates of their accession and withdrawal:

Ben Jonson.......	1630-1637	Colley Cibber.....	1730-1757
William Davenant.	1638-1668	Wm. Whitehead...	1758-1785
John Dryden......	1670-1689	Thomas Warton...	1785-1790
Thomas Shadwell..	1689-1692	Henry James Pye.	1790-1813
Nahum Tate......	1693-1714	Robert Southey...	1813-1843
Nicholas Rowe....	1714-1718	Wm. Wordsworth.	1843-1850
Lawrence Eusden..	1719-1730	Alfred Tennyson...	1850.

As might be inferred from many of the names in this list, political considerations often controlled the appointment to the office. Such considerations removed Dryden and substituted in his place Shadwell, whose appointment the earl of Dorset vindicated, "not because he was a poet but an honest man." To such an extent was the degradation of the office carried by its connection with unworthy names, that a strong feeling was raised in favor of its abolition. After the derangement of George III. in 1810 the performance of the annual ode was suspended, and subsequently fell completely into disuse. Upon the death of Pye the office was offered to Walter Scott, who declined it, but recommended Southey; and the latter was appointed with the virtual concession, which has since become the rule, that he should write only when and what he chose. Wordsworth wrote nothing in return for the distinction, and Tennyson has written but little.

POETRY (Gr. ποιεω, to make), imaginative composition in metrical or highly fanciful language. In this work the history of poetry is treated in connection with the literature of the several nations of the world, and with the biography of individual poets. See also Bacchanalian Songs, Ballad, Drama, Epic, Elegy, Lyric, and Sonnet.

POGGENDORF, Johann Christian, a German natural philosopher, born in Hamburg, Dec. 29, 1796. Having devoted considerable attention to pharmacy, chemistry, and natural philosophy, he went to Berlin in 1820 for the purpose of prosecuting his studies, and in 1821 published in the *Isis* a treatise "On the Magnetism of the Voltaic Pile," in which were developed for the first time the principles of the application of the multiplicator. In 1824 he was appointed editor of the "Annals of Natural Philosophy and Chemistry," which under his direction became one of the first scientific journals of Germany. In 1834 he became professor of natural philosophy in the university of Berlin, and in 1838 member of the academy of sciences. He was engaged with Liebig in editing a "Dictionary of Chemistry," for which however he did little after the first volume. In 1853 appeared his "Studies for a History of the Exact Sciences," the forerunner of a "Biographical, Bibliographical, and Historical Dictionary of the Exact Sciences," begun in 1858. His scientific investigations have been directed chiefly to electricity and magnetism.

POGGIO BRACCIOLINI. See Bracciolini.

POGGY ISLANDS. See Nassau Islands.

POINDEXTER, George, an American politician, born in Louisa co., Va., died in Jackson, Miss., Sept. 5, 1853. He began his career as a lawyer in Milton, Va., but in 1802 removed to Mississippi territory, where soon after he was commissioned by Gov. Claiborne as attorney-general, which appointment he held when Aaron Burr was arrested by the territorial authorities. He was involved in many quarrels, personal and political, and from one of these a duel resulted in which he killed Abijah Hunt, then the most extensive merchant of the South-West. Bitter and prolonged controversies grew out of this affair, and Mr. Poindexter and his seconds were charged with gross unfairness, but the charges were never satisfactorily sustained. In 1807 he was elected delegate to congress, where he soon became distinguished as a debater. He remained in congress until

1816, when, against the remonstrance of a majority of the bar of Mississippi, he received the appointment of U. S. judge for that district. It was an office that demanded the highest grade of professional attainment, owing to the conflicting tenures and extensive litigation arising from ill defined and fraudulent grants of land made by the Spanish and British authorities, formerly proprietors of the public domain; and, notwithstanding the previous enmity to him and doubts of his integrity, it is acknowledged that Judge Poindexter discharged the duties of his office with eminent ability and impartiality. After the admission of Mississippi as a state in 1817 he was elected its first representative in congress. In the great debate in the house in the beginning of 1819 on the conduct of Gen. Jackson in the Seminole war, the speech of Poindexter was regarded as the ablest delivered, and to it more than to any other Jackson owed his triumphant acquittal. After the close of his term he was elected governor of Mississippi, notwithstanding the most violent assaults upon his character, including a false charge of gross cowardice in the battle of New Orleans, where he served as volunteer aid to Major-Gen. Carroll. In 1831 he was chosen a member of the U. S. senate, where, from being a personal and political friend of Jackson, he gradually took his place in the ranks of the opposition. He occupied, as he contended, a middle ground between the parties of Clay and Calhoun; but there was little practical difference between Calhoun and himself. He became exceedingly obnoxious to Gen. Jackson, and was suspected by him of complicity in the attempt made upon his life at the capitol. In 1835, disgusted at the conduct of his own state, and influenced also by the prospect of political promotion that had been held out to him in Kentucky, he removed to Louisville, but his expectations were disappointed. He was commissioned by President Tyler to investigate certain frauds in the New York custom house, and finally resumed his citizenship in Mississippi, and his connection with his old political friends.

POINSETT, a N. E. co. of Ark., bordered E. by the St. Francis river and Lake St. Francis, and drained by the L'Anguille and several other rivers; area, 1,850 sq. m.; pop. in 1860, 3,621, of whom 1,096 were slaves. It has a level surface and fertile soil. The productions in 1850 were 164,099 bushels of Indian corn, 2,715 of wheat, 8,800 of oats, and 1,017 bales of cotton. In 1850 there were 5 churches, and 220 pupils in public schools. Capital, Bolivar.

POINSETT, Joel Roberts, an American statesman, of Huguenot descent, born in Charleston, S. C., March 2, 1779, died in Statesburg, S. C., in Dec. 1851. His education was completed in Europe at a private school near London, and he studied medicine and the natural sciences at the university of Edinburgh, after which he entered the military academy at Woolwich. In 1800 he returned to Charleston and commenced the study of the law, but from ill health he returned in 1801 to Europe, and remained a number of years, visiting nearly the whole of the continent. Returning to the United States in 1809, he was sent by President Madison to South America to ascertain the political condition of the country. He visited Rio Janeiro and Buenos Ayres, and thence crossed the continent to Chili, establishing friendly relations in behalf of the U. S. government. On his return to South Carolina he became a member of the legislature, and in 1821 was elected to congress from the Charleston district. In the succeeding year he visited Mexico in a semi-diplomatic capacity to report upon the condition of the country and the policy of opening diplomatic relations with the emperor, Iturbide. He was twice reëlected to congress, and upon the accession of Mr. Adams to the presidency received the appointment of minister to Mexico. The distracted state of the country at that time rendered it difficult for a diplomatic agent to avoid committing himself in favor of one or another of the various factions into which the people were divided, and Mr. Poinsett was accused by the aristocracy and the church party of interfering against them. He justified his course in a pamphlet published after his return. He held the office at considerable personal risk for 18 months, negotiating during that period a treaty of limits and one of commerce, and was recalled by President Jackson. Returning to Charleston in the midst of the nullification excitement, he attached himself to the union party, of which he became the leader, and which, though asserting the state rights doctrines, held that nullification was disunion, and that the passage by congress of a protective tariff did not justify so extreme a measure. After the defeat of the union party, for whose cause Mr. Poinsett labored with great earnestness, he retired for several years from public life. In 1837 he was appointed by President Van Buren secretary of war, in which capacity he urged the maintenance of a portion of the militia on a war footing—a measure which was denounced as an attempt to organize a standing army. During his residence in Washington he took much interest in the welfare of the city, and endowed the national institute with a valuable museum, beside distributing large collections of objects of antiquarian interest among the public institutions of New York, Philadelphia, Charleston, and other places. The last 10 years of his life were passed in retirement. On his return from Mexico he published a volume of "Notes" on that country (Philadelphia and London, 1824), and he was an occasional contributor to the "Southern Quarterly Review," the "Democratic Review," and other periodicals. He left a large body of correspondence, notes, and memorials relating to the greater part of his career, but which have not yet been edited.

POINT COMFORT. See Old Point Comfort.

POINT DE GALLE, a fortified town in Ceylon, situated upon a rocky promontory at the S. W. extremity of the island, 72 m. S. S. E. from Colombo, 572 m. from Madras, 2,150 m. from Aden, and 1,213 from Penang; pop. about 5,000. It is the coaling depot and port for transshipping passengers and goods from one line to another for the steamers that ply between Calcutta, Australia, and Suez, Bombay, Penang, Singapore, and China, with branches to the Dutch and Spanish possessions in the Indian archipelago. The native artisans are celebrated for their skill in making gold and silver ornaments, workboxes, &c.

POINTE COUPÉE, a S. E. parish of La., bordered E. by the Mississippi river and W. by the Atchafalaya; area, 576 sq. m.; pop. in 1860, 17,720, of whom 12,903 were slaves. It has a low and level surface, subject to overflow by the river, and a fertile soil. The productions in 1850 were 199,790 bushels of Indian corn, 43,643 of sweet potatoes, 8,560 hhds. of sugar, 821,546 galls. of molasses, and 1,622 bales of cotton. There were 2 churches, 1 newspaper office, and 160 pupils attending public schools. Capital, Pointe Coupée.

POINTER (*canis avicularis*), a well known sporting dog belonging to the race of hounds, which it resembles in general aspect, character, and colors. Though frequently called Spanish, and probably introduced by the Phœnicians into western Europe through Spain, the breed is generally believed to have originated in the East. Their habit of standing fixed and pointing to game is the result of a long course of severe training; and, from the succession of generations educated to this purpose, the faculty has become innate to such a degree that young dogs of the pure breed point with scarcely any instruction; good dogs have been known to stand pointing for an hour at a time. When shooting supplanted hawking and coursing, in the latter part of the 17th century, the pointer and other trained dogs took the place of the more powerful, fiercer, and swifter hounds. The hair of the pointer is smooth, sometimes marked like the fox hound, but generally with more spreading dark colors; and some of the best breed are entirely black. The thorough-bred Spanish pointer has the nostrils separated by a deep groove, and their wings dilated and very sensitive. The position of the pointer, with his head to the game and one fore foot raised, is familiar to all; a good dog will not only stand thus at the scent of his game, but will instantly back if he sees another dog point, in company with him.

POISON, any substance which, introduced in small quantities into the animal economy, seriously disturbs or destroys the vital functions. Under this head are obviously included a vast number of bodies belonging to the mineral, vegetable, and animal kingdoms, some solid, others fluid, and others gaseous, and deleterious vapors and miasmata imperceptible to the senses. The science which treats of these is designated toxicology. Until of late years the true nature and effects of poisons were little understood, although poisonous mixtures were much used among the ancient Greeks and Romans as a means of destroying life. What the preparations were of this character which they employed we have no means of ascertaining, and it is altogether uncertain whether the deadly hemlock was a plant we can now identify. (See Hemlock.) Among the multitude of substances that rank as poisons are many, some possessing the most active qualities, which are also useful drugs, and which, administered in suitable quantities, are recognized among medicines in universal employment and of the most beneficial character. Such are the preparations of opium, tobacco, the salts of mercury, and even arsenic. The active ingredients of several articles used for food are also in a concentrated state virulent poisons, as caffeine, &c.; and various other articles of food, as shell fish and eggs, sometimes affect some persons as poisons.—The action of poisons upon the human system is variously exhibited. Some merely corrode and destroy the textures they come in contact with, and the sympathetic influence of such injuries may reach the vital functions. Others produce local inflammations, and some act upon the nerves of the parts they reach. Some poisons, most virulent when introduced into the circulation, as the venom of snakes, may be swallowed with impunity. But most poisons, however they may be introduced into the system, whether through the cuticle, by respiration, or by the alimentary canal, are rapidly disseminated, probably through the blood, and their influence is felt in those organs which are peculiarly sensitive to their action. Many soon reach the brain and produce a fatal coma. Arsenic attacks the stomach and intestines. As remarked by Dr. Christison: "The spine is affected by nux vomica, the kidneys and bladder by cantharides, the lungs by tartar emetic, the heart by oxalic acid, the liver by manganese, the salivary organs by mercury, and many of the glands by iodine." Some of them, moreover, as arsenic and mercury, affect at the same time different organs. The quantity of many of these substances required to produce poisonous effects is extremely minute; in the case of poisonous reptiles and insects, and the virulent fluids of dead bodies after certain diseases, it is quite insignificant. Strychnia and prussic acid may either of them prove fatal in a few minutes to a strong man when taken in the dose of a grain. But various circumstances greatly modify the action of the poisons. Some persons are much more susceptible to their influence than others. Many are almost sure to be affected by passing through a wood where certain poisonous plants grow, while others may even handle the plants themselves with impunity. The classification of poisons into three great divisions, founded on the symptoms they produce, is noticed in the article Medical Jurisprudence, vol. xi. p. 849; the treatment adapted to correct the effects of the several poisons in the article Antidotes; and the characters of the most important poisonous substances are given under their respective names.—In the case of the bites of poisonous snakes, several effective modes of treatment are reported of late as having been introduced in the western states. Popular remedies have been large draughts of whiskey, and chewing and swallowing tobacco, and also applying it to the wound. The alcohol does not apparently act as an antidote, but it stimulates the nervous system, keeping it above the depressing influence of the poison till this is overcome by the natural curative action. The tincture of iodine applied externally has proved a very remarkable remedial agent. The method of using it in recent cases or within 15 hours after the bite is to inject the cellular tissue in and about the wound with the tincture by means of a sharp-pointed silver syringe, and apply the same upon the swollen parts and 2 or 3 inches beyond them. If the case is further advanced, wine or brandy is given in addition, with iodide of potassium and chloride of potassium largely diluted in water and followed by tonics. Dr. B. J. D. Irwin of the U. S. army reports the discovery of an antidote to the poison of the rattlesnake, in common use with universal success by the Mexicans and Indians. This is a plant known among them as the *golondrinera*, and which proved, when examined by Prof. John Torrey of New York, to be a species of *euphorbia*, several of which, as the *E. capitata*, *E. corollata*, *E. palustris*, and *E. villosa*, are also celebrated as specifics against the bites of poisonous animals. The golondrinera is the *E. prostrata*, a plant of frail delicate appearance, somewhat like the gold-thread, and having long reddish stems that spread and interlace with each other. Its flowers, which appear from April to November, are very small, white with dark purple throat. They are axillary, and have 4 petals and 4 sepals. All parts of the plant, even the large root, contain an abundance of milky juice, in which its medicinal properties reside. It grows plentifully in dry gravelly and sandy places, by roadsides and in farm yards. Its juice is extracted by bruising portions of it in a mortar. A considerable portion of water is added, and several ounces of the mixture are administered to one bitten by any of the venomous snakes, scorpions, tarantulas, or other poisonous reptiles, which abound in Arizona and Sonora. The remedy is said never to fail of effecting a cure, and its administration is attended with no danger. Its action is that of an emetic and cathartic.

POISON IVY, or **Poison Oak**, a poisonous shrub or vine common throughout the United States, and called sometimes by one and sometimes by the other name. It belongs to the natural order *anacardiaceæ*, and was named by Linnæus *rhus toxicodendron*, or when climbing trees, *R. radicans*. It ascends trees and rocks, attaching itself to them by multitudes of strong root-like fibres that project from the stem, and maintain a strong hold upon the bodies they reach. The leaflets grow 3 together at the end of long petioles; they are rhombic ovate in form, mostly pointed, smooth and shining on both sides, and rather downy beneath. A yellowish milky juice exudes from a broken leaf or stem, and becomes by exposure of a permanent deep black color, making a most perfect indelible ink for linen; this is soluble in boiling ether. If when obtained by pounding the leaves in large quantities the juice retained this property, it might prove to be a valuable dye; but such is found not to be the case. The juice and effluvium from the plant exert a poisonous influence to which many persons are extremely sensitive, while others are not at all affected even by chewing the plant. Though the poisoning rarely proves fatal, the eruptions and swellings produced are attended with much pain and distress, which however usually yield to the ordinary treatment by purging and external use of sugar of lead, &c. The variety common in California, there known as the poison oak, sometimes attains a diameter of stem of 6 inches. It appears to be much more virulent in its action than the poison ivy of the East, and cutaneous diseases resembling salt rheum are said to frequently follow its attacks and resist the common remedies. They are, however, cured by what appears to be an infallible antidote to the poison, a decoction of a plant called the *grindelia* (*G. hirsutula* or *G. robusta*), a perennial shrub of the natural order *compositæ*. The plant grows from 1 to 3 feet high, and bears from June to October heads of small yellow flowers like sunflowers. The buds and other parts of the shrub contain a white and sticky resinous matter in which the remedial virtue chiefly resides. The same application is found alike beneficial for many cutaneous diseases. The leaves of the poison ivy have themselves been used as a medicine for the same diseases, being administered internally in doses of a grain each several times a day. A tincture of the plant is also administered internally by the homœopathists as a remedy for various eruptive diseases, and for some paralytic affections.

POISSON, Siméon Denis, a French geometer, born in Pithiviers, Loiret, June 21, 1781, died in Paris, April 25, 1840. He was educated at the polytechnic school, where he became a tutor and professor. In 1809 he was made a professor in the faculty of sciences, and in 1811 in the normal school. His most important production is the *Traité de mécanique* (2 vols. 8vo., 2d ed., 1833). His last work, *Théorie du calcul des probabilités*, appeared in 1838.

POITIERS, or Poictiers (anc. *Lemonum* or *Limonum*, afterward *Pictavi*), a town of France, capital of the department of Vienne, 211 m. S.

S. W. from Paris; pop. in 1856, 26,233. It is situated on a rounded eminence on the left bank of the river Clain, and at the mouth of the Boivre. These two rivers anciently formed a natural fosse without the ramparts of the town and entirely surrounding it, except at a point in the S. W. where was an isthmus defended by a strong wall and an artificial ditch. This space is now converted into a promenade. The town is enclosed by old turreted walls, pierced by 6 gates, 4 of which open on bridges over the Clain. Coarse woollen cloths, blankets, hosiery, lace, &c., are manufactured.—The ancient Lemonum was the chief city of the Celtic Pictones. It was pillaged by the Vandals in A. D. 410, and afterward fell into the hands of the Visigoths, who were driven from it by the Franks. Near it the Visigoths under Alaric were decisively beaten by Clovis in 507, and in 732 Abderrahman and his Saracens were defeated a few miles N. E. of this town by Charles Martel. By the marriage of Eleanor of Guienne to Henry Plantagenet, who became king of England, Poitiers came into the hands of that prince, and was held by the English until 1204, when it was wrested from them by Philip Augustus. On Sept. 19, 1356, a few miles from the city, was fought the famous battle of Poitiers, in which John II. of France, with an army variously stated to be 50,000 and 80,000 strong, was defeated by Edward the Black Prince at the head of 8,000 English and Gascon soldiers. The English were posted in such a manner that they could only be approached through a narrow lane, in which 4 men could scarcely ride abreast, and which was covered upon both sides by very heavy hedges. In the hedges were the English archers, and at the head of the lane in broken ground and among vines were the men-at-arms. The cavalry or knights were held in reserve. Upon this strong position the French, sure of an easy victory, threw themselves with great impetuosity. The first volley from the archers put them into a confusion from which they did not recover. Their charge upon the men-at-arms entirely failed, and being charged in turn and already in great disorder they were completely routed, and King John was captured. Poitiers again reverted to France in 1372 by the voluntary surrender of the townsmen to Charles V. While the English were in possession of the larger part of France, Charles VII. held his court and parliament at Poitiers for 14 years, and during that time great additions were made to the town. During the war of the league it was taken from the Huguenots by the Catholics, and Admiral Coligni made an unsuccessful attempt to retake it in 1569.

POITIERS, Diana of. See Diana.

POITOU, an ancient province in the W. of France, bounded N. by Brittany, Anjou, and Touraine, E. by Berry, Marche, and Limousin, S. by Angoumois, Saintonge, and Aunis, and W. by the bay of Biscay. Previous to the conquest of Gaul by Cæsar, it was inhabited by the Pictavi or Pictones; it afterward formed a part of the province of Aquitania, was conquered by the Visigoths in the beginning of the 5th century, fell into the hands of Clovis, king of the Franks, in 507, and under his Merovingian successors was held by the dukes of Aquitania. During the reign of Pepin the Short it became part of the Carlovingian empire, and received counts of its own. It passed into the hands of the family of Plantagenet by the marriage of Henry II. of England with Eleanor of Poitou and Aquitaine, was taken from John Lackland in 1204 by Philip Augustus, and was recaptured by the English after the battle of Poitiers in 1356, remaining in their hands until 1369, when Charles V. again subjected it. Before the revolution of 1789 it was divided into Upper and Lower Poitou. Before the execution of Louis XVI. the Poitevins rose in insurrection against the convention, and under the name of Vendeans and the leadership of their lords waged a terrible war. They were partly subdued by Gen. Hoche in 1795, but remained royalists at heart. Attempts to renew civil war took place in 1814 on the fall of Napoleon, and after that of Charles X. in 1830 and 1832, but failed. Poitou is now divided into the departments of Deux-Sèvres, Vienne, and Vendée.

POKE (*phytolacca decandra*), a common plant, the typical genus of the natural order *phytolaccaceæ*, with a stout, herbaceous, smooth stem, growing from 6 to 9 feet high; large, spindle-shaped, branching, and perennial roots; scattered, petiolate, ovate oblong leaves, smooth on both sides, ribbed beneath, entire and acute; flowers in racemes, the sepals white and membranous on the margin; stamens 10, with white, roundish, 2-lobed anthers; ovary round with 10 short recurved styles, which uniting form a celled berry, each cell containing a vertical seed. It is a native of North America, and has become naturalized in some of the southern parts of Europe. Other species are indigenous to America, Africa, and India, both within and without the tropics. The common poke delights in rich soils, and particularly thrives on newly cleared and burnt woodlands, where it assumes the habit of a strong and luxuriant weed. Even after its foliage has fallen, its racemes of shining black berries, contrasting with its bright crimson stems and branches, render it conspicuous. These berries contain an abundance of deep purple juice; and tinctures prepared of it have been considered a popular remedy for chronic rheumatism. The root is a violent emetic, and the leaves are extremely acrid, yet the young shoots just springing from the ground are used as a substitute for asparagus. Employed externally as a local stimulant, either in the form of extract or in ointment, the plant has been found efficacious in itch and scald head. Some repute has been given to poke in treatment of cancer, but it is presumable that some milder disease had been mistaken for it. The several names of cocum, pocan, poke, pokeweed, pigeon berry, mechoacan, and garget have been applied to the same species of *phytolacca;* and the

American hellebore (*veratrum viride*, Aiton) is likewise called Indian poke or pokeroot (see HELLEBORE), a far more valuable plant, and related to the European species, which is in high repute. The berries of the common poke are eaten by birds. Their juice has been used to give color to wines, but the practice is discountenanced as injurious. Some value is likewise attached to its root in veterinary medicine.

POLA, a fortified city of Istria in Austria, on the bay of Porto delle Rose, 15 m. S. S. E. from Trieste; pop. 11,000. It is surrounded by Venetian walls of the 15th century, has a cathedral, a Greek church, and 3 convents, and one of the best harbors in Europe. A colony was established at Pola by Augustus, when it was called Pietas Julia; and subsequently it became so flourishing that in the reign of Severus it numbered 30,000 inhabitants. Some of its ruins have been singularly well preserved. Of these the most remarkable are the amphitheatre, 436 feet in length by 346 in breadth, two temples, one of which was a favorite study of the Italian architects, triumphal arches, and portions of the ancient walls.

POLAND (Pol. *Polska*), KINGDOM OF, the westernmost province of Russia in Europe, situated between lat. 50° 4′ and 55° 6′ N., and long. 17° 30′ and 24° 20′ E.; area about 49,539 sq. m.; pop. in 1857, 4,789,379. It is bounded N. E. and E. by the Russian provinces of Lithuania (the governments of Kovno, Wilna, and Grodno) and Volhynia, S. by Austrian Galicia, and W. and N. W. by the Prussian provinces of Silesia, Posen, and West and East Prussia. All these surrounding provinces, as well as numerous others, were formerly parts of the once independent and powerful state of Poland, of which the present nominal kingdom is thus but a fragment. This country consists of a quadrangular territory, from the N. E. corner of which a long and narrow tract, bounded by Lithuania and E. Prussia, stretches northward. The average breadth of the quadrangle from E. to W. as well as its length from N. to S. is about 200 m. By far the greater part of the country is a plain, sinking gently toward the Baltic; only the southern regions are hilly or slightly mountainous, being traversed by the northernmost offshoots of the Carpathians. The Vistula, which flows from that mountain range to the Baltic, enters Poland a little below Cracow, running N. E. along the southern or Galician frontier as far as the mouth of the San, sweeps in a northerly and then northwesterly direction through the middle of the kingdom, and leaves it a little above the Prussian fortress of Thorn. On the right it receives the Wieprz, which rises in the S. E. corner of the country, and the Bug, which rises in Galicia and flows along the E. or Russian frontier; on the left the Nida, the Pilica, which rises in the S. W. corner, and the Bzura. The Narew, which rises in the Russian government of Grodno and receives the Bobr, is an affluent of the Bug from the right, joining it near its mouth. The Niemen, which has its source in the government of Minsk, having traversed Lithuania, reaches Poland near the town of Grodno and flows along the Lithuanian frontier toward the Baltic. The Warta, the source of which is near that of the Pilica, and its affluent the Prosna, which partly separates Poland from Silesia and Posen, are tributaries of the Oder. Most of these rivers are navigable, and form channels for the exportation of produce through the Prussian towns of Dantzic, Stettin, and Tilsit, to the Baltic. There are lakes in the northern part near the Prussian boundary, but none of much size. The climate is healthy but severe, the summer being very hot and the winter very long and exceedingly cold. In the former season, especially when the S. E. winds blow from the steppes of Russia, the thermometer sometimes rises above 90° F., and in the latter it more frequently descends to 15° below zero. The rivers are sometimes ice-bound and the fields covered with snow for 4 or 5 months continuously. The soil is mostly a fertile sandy loam; but there are numerous unproductive tracts covered with sand, heath, or swamps. Rich pastures and vast forests abound. The region between the upper Bug and Vistula is the most fertile, that between the Vistula and the Pilica the most varied and picturesque. The principal productions are wheat, rye, barley, oats, and buckwheat; various leguminous plants; apples, excellent cherries, and other fruit; many kinds of berries, especially strawberries, which are equally delicious and abundant; pine, fir, birch, oak, ash, hazel, lime, and other forest trees; silver, iron, copper, lead, and zinc; cattle, hogs, bees in great swarms, poultry, sheep, and horses, some breeds of the last two being among the best in eastern Europe. Of wild animals the most common are the deer, fox, marten, polecat, weasel, and wolf, the last of which in very severe winters frequently infests the rural districts; among the singing birds are the skylark and the nightingale; the principal fish is the pike.—The bulk of the population consists of Poles, of whom the higher classes are generally well formed, vivacious, warlike, hospitable, and patriotic, but often rash and violent; the women are graceful and spirited, and the peasants sturdy, good-natured, but slavish. The Jews, who form ⅛ of the population, and are allowed to live only in separate town quarters, are mostly poor, careless in dress, speech, and manners, but benevolent, religious, and intellectual. The Germans, who live chiefly in manufacturing towns and in separate agricultural settlements, are distinguished above all the other inhabitants by industry, economy, and cleanliness, but are little liked in other respects. Russians (except the garrisons) and gypsies are not numerous. The Poles almost all belong to the Roman Catholic church; the Germans are mostly Lutherans; the Russians have churches of the Greek rite. The main resources of the country are agriculture and mining. Commerce and the trades are to a great extent in the hands of the Jews, and manufactures in those of the Germans. Woollen cloth, cotton goods, flannel, merinoes, shawls, hosiery, leather, paper, glass, beet root sugar, beer, spirits, iron and zinc, musical instruments, clocks and watches, and carriages are among the principal manufactures, some of which are exported to the various provinces of Russia. Grains, seeds, oil, honey, wool, metals, and timber are exported to the Baltic ports, mostly down the Vistula to Dantzic. A strictly guarded customs line protects home manufactures against foreign competition. A railroad, running across the country in a N. E. and S. W. direction, connects the capital, Warsaw, with the Russian, Austrian, and Prussian provinces. Some of the other important towns are: Sandomir, Pulawy, the fortress New Iwangorod, Praga, a suburb of Warsaw, the fortress New Georgiewsk or Modlin, and Plock, on the Vistula; Czenstochowa, Sieradz, Kolo, and Konin on the Warta; Kalisz on the Prosna; Piotrkow, Lodz, and Rawa, between the Warta and the Pilica; Lowicz on the Bzura; Kielce, Opatow, Konskie, and Radom, between the Pilica and Vistula; Lublin, Lenczna, and the fortress Zamosc, near the Wieprz; Wlodawa and Nur on the Bug; Siedlce S. of it; Lomza, Ostrolenka, and Pultusk on the Narew; Suwalki and Kalwarya in the N. E. projection. The last division of the country is into 5 governments, viz., of Warsaw, Radom, Lublin, Plock, and Augustowo (capital Suwalki), which has superseded a former one into 6 palatinates, viz., of Masovia (capital Warsaw), Kalisz, Cracow (capital Kielce), Sandomir, Podlachia (capital Siedlce), and Lublin. The present governor is Prince Michael Gortchakoff.—The Poles form one of the principal branches of the Slavic family of nations. Their ancestors are believed by the best historians to have occupied the same regions during or soon after the time of the great migration of nations. A few centuries later they appear under the name of Polans between the Oder and Vistula, of Lenczycans E. of the Warta, of Masovians between the Vistula and the Narew, and of Kujavians, Kassubs, and Pomeranians on or near the lower Vistula, being surrounded by kindred tribes, the Obotrits, Wends, Sorabians, Lusatians, Silesians, Bohemians, Moravians, and White and Red Croats, on the W. and S., and by the Prussians, Lithuanians, and others on the E. The Polans, probably so named as inhabitants of the plain (Pol. *pole*, field, plain), formed the most conspicuous group, and eventually gave their name to the whole nation. Their leader or prince Lech, the founder of the city of Gnesen (about A. D. 550), is the first among the heroes of the earliest, that is, legendary Polish history. But as Lach is still used for Pole among the Russians, the name of the fabulous brother of Czech (Bohemian) and Rus (Russia) probably belonged to the people. Equally fabulous are, among others, Krakus, the founder of Cracow; his daughter Wanda, who is said to have defeated in battle a German suitor, Rytygier, whom her patriotism did not allow her to marry, and then to have drowned herself in the Vistula; and the tyrant Popiel, said to have been devoured by mice in his castle in the middle of Lake Goplo. The election of Piast, a pious and benevolent peasant of Kruszwica, as king, is also regarded as mythic, his son Ziemowit being considered the first historical ruler of Poland (860). Little, however, is known of him, or of his successors before Miecislas I. (962-992), who having married Dombrowka, a Bohemian princess, was induced by her to convert his people to Christianity. He divided his dominions among his sons, but Boleslas, the eldest of them, surnamed the Brave or the Great, made himself master of the whole inheritance, extending it by conquests even beyond the Oder, the Carpathians, and the Dniester. He was acknowledged as an independent monarch by the emperor Otho III., who came to Poland to visit the tomb of St. Adalbert at Gnesen; but he afterward carried on long wars against Otho's successor Henry II., with whom he finally concluded a peace at Bautzen (1018). Dissensions between the successors of Vladimir, grand prince of Kiev, called him to Russia, and he entered that capital in triumph, striking its gold-covered principal gate with a sword received from Otho, which was afterward known among the insignia of the Polish crown under the name of *szczerbiec* (notched). He was no less successful in peace, promoting commerce, a strict administration of justice, and the spread of the new religion, and strengthening the internal defences of the country. This was, however, still in a comparatively rude condition. The principal places were little more than small towns; most of the inhabitants were agriculturists bound to do military service; those who were able to equip a horse were regarded as nobles; prisoners of war were held as serfs; and the government was entirely autocratic. Boleslas was fond of splendor, sports, and military displays, and shortly before his death (1025) had himself crowned as king by his bishops. The reign of his son Miecislas II. was short. His widow Rixa, a granddaughter of the emperor Otho II., reigned for some time badly in the name of her son Casimir, and finally fled with the treasure and the royal insignia to Germany. Casimir followed her, and a period of anarchy ensued. The national heathenism prevailed over the imported worship; the Christian priests were murdered, and their churches destroyed. Russians and Bohemians, grasping the opportunity to take revenge for late defeats, invaded the country. Casimir, who had lived for years the life of a monk, was now recalled (1040), and by the restoration of peace, order, and Christianity, gained the surname of "the Restorer." His son Boleslas II., or the Bold (1058-'81), was warlike, like the first of that name, but without his ability as a ruler. He triumphed over the Bohemians, decided by his intervention the disputes about the Hungarian throne, and on a similar expedition to Russia occupied Kiev. This city, however, proved a Capua to his warriors; the war was protracted for years, and lawlessness and profligacy prevailed in the meanwhile in Poland. On his return he committed acts of tyranny, and even stained his hands with the blood of St. Stanislas, bishop of Cracow, who had reprimanded him. This roused the people against him, and he died in exile. His brother Ladislas (Wladyslaw) Herman (1081–1102), weak-minded and sluggish, resigned the regal title, being satisfied with that of duke, and intrusted all affairs of state to a favorite, Sieciech, whom he raised to the dignity of palatine (*wojewoda*), and whose sway caused general discontent. His two sons finally compelled him to banish the favorite, and Ladislas Herman died soon afterward. His son Boleslas III., the Crooked Mouth (1102–'39), warred with success against the Prussians, conquered Pomerania, converting its inhabitants to Christianity, and defended Silesia against the emperor Henry V.; but, no less passionate than brave, he took a bloody revenge on his half brother Zbigniew for repeated provocations, and died broken-hearted after having been worsted by the Hungarians, Bohemians, and Russians. By his will he divided his dominions among his 4 eldest sons, the youngest, Casimir, receiving no share. Henry received Sandomir, Mieczislas III. (the Old) Great Poland (or Poland proper) with Posen, Boleslas IV. (the Curly-haired) Masovia and Kujavia, and Ladislas II. Pomerania, Silesia, Sieradz, Lenczyca, and Cracow, with the guardianship of his brothers and the title of monarch. But the harmony among the family was of short duration. Ladislas, incited by his German wife, tried to dispossess his brothers, and was deposed. Boleslas was elected monarch in his stead, but after a war against Frederic Barbarossa, who intervened in favor of the eldest line, finally ceded Silesia to the sons of Ladislas, and this province eventually became severed from Poland and Germanized. Mieczislas, who succeeded Boleslas as monarch, shared the fate of the eldest brother (1177), and the crown devolved upon the youngest, Casimir II., surnamed the Just, who had succeeded Henry in Sandomir, and had subsequently also inherited Masovia and Kujavia. He was successful both in peace and war. Important reforms took place during his reign in the administration of the country. An assembly of bishops convoked at Lenczyca in 1180 established the rights of the peasants and the clergy. A senate was formed consisting chiefly of bishops, palatines, and castellans, or governors of the fortified castles. Thus the monarchy became limited by the introduction of a kind of oligarchy, which by subsequent changes was developed into a powerful aristocracy. This was in part a natural consequence of the division of the country, which brought about the appointment of numerous ducal palatines and other officers, chosen from among the nobles. The interests of the lower classes, too, were after the death of the virtuous Casimir more and more disregarded; domains and single estates were granted as presents or rewards to favorites or public officers, with the right of jurisdiction over the peasantry; the obligations of the latter were gradually extended, while the higher nobles were exempted from all public burdens. An attempt of Mieczislas the Old to recover the crown after the death of Casimir failed. The son of the former, Ladislas, was also set up as a rival to that of the latter, Lesco (Leszek) I., the White, but generously resigned (1207). Thus the youngest line of the house of Boleslas Crooked Mouth remained in possession of power. Lesco himself took the provinces of Cracow, Sandomir, and Pomerania; his brother Conrad received Masovia, Kujavia, Sieradz, and Lenczyca. Lesco, a worthy son of Casimir the Just, repeatedly interfered in the affairs of the distracted Red Russian principality of Halicz (Galicia), protecting the house of his former enemy Prince Roman against native factions as well as against the Hungarians. He then turned his attention to the affairs of his own province, Pomerania, in a part of which Sventopelk, a native governor, who had delivered the coast land of the Baltic from the Danes, strove to assume absolute power. Lesco tried to bring about a peaceful settlement, but was treacherously murdered by the Pomeranian. The province, a conquest of Boleslas III., was lost. Conrad, too, who was as rash and cruel as his brother was mild, was unable to cope with his heathen Prussian neighbors. He called to his assistance the Teutonic knights, who were not satisfied with the conversion of the half savage people, but made conquest and power their principal object, carried their arms into Lithuania and Podlachia, and soon became terrible enemies of Poland. Boleslas V. the Bashful (1227–'79), who succeeded his father under the guardianship of his uncle, and grew up to become "an unjust judge, peace-loving knight, and careless ruler," was not the man to restore the power of the state. This was almost annihilated by the great invasion of the Mongol Tartars. Boleslas escaped beyond the Carpathians, whence he continued his flight together with King Béla of Hungary; the people sought refuge in the vast forests or behind the walls of the scanty fortresses. The Mongols burned Cracow, and carried death and devastation even beyond the Oder. Duke Henry the Pious of Silesia fell with his knights on the great battle field of Wahlstatt near Liegnitz in 1241, but the invaders now commenced their retreat, pillaging, burning, and carrying off men and cattle. The decay of the country was general and gradual. The heirs of Conrad subdivided his possessions. Various western districts were pledged for loans or ceded to neighboring German princes, especially to the margraves of Brandenburg, and the Bohemians occupied parts of southern Silesia. The numerous German settlers in the towns, though useful for their industry, extended the influence of their native country by the spread of their language and the introduction of German customs and even laws, especially those regulating commerce and trade, and almost denationalized parts of their adopted land. German warriors and adventurers flocked to the shores of the Baltic, where the Teutonic knights, pressed by the Prussians, Lithuanians, and Sventopelk of Pomerania, allied themselves with the knights sword-bearers of Livonia for common crusading wars on the confines of Poland. The Jews, too, who in the time of the crusades were driven by persecution from Germany, retained in Poland the language which they had adopted on the banks of the Rhine and Danube. Tartars, Red Russians, and even the Lithuanians, who found an able prince in Mindog, made occasional incursions. Still Boleslas succeeded in annexing Podlachia. He left the country in a distracted condition, which grew still worse during the short reigns of his successors Lesco II. the Black, a grandson of Conrad, Premislas (Przemyslaw), duke of Posen, who was crowned king at Gnesen in 1295, but soon after murdered by Brandenburgians, and Wenceslas, king of Bohemia, who was elected by the people of Great Poland as a rival to Ladislas the Short (Lokietek), a brother of Lesco II. This prince, who had saved his life once before by escaping in disguise, again became a fugitive, and made a pilgrimage to Rome, but, growing manly, steady, and resolute in misfortune, returned to Poland in 1305, was well received in Cracow and Sandomir (Little Poland), but had to struggle hard against factions in Great Poland and elsewhere, the encroachments of the Teutonic knights, and numerous deeply rooted abuses. He succeeded in restoring order and the unity of the larger part of the country (Silesia subjecting itself to the Bohemian kings); made Cracow its permanent capital, where he was solemnly crowned in 1319; reformed judicial abuses; abolished numerous illegally acquired privileges; convened an assembly of senators, chancellors, regal officers, and other nobles for legislative purposes at Chenciny in 1331, which may be regarded as the first Polish diet (*sejm*); and in alliance with the powerful prince of Lithuania, Gedimin, carried on a vigorous war against the Teutonic knights. Returning from his last campaign, the septuagenarian monarch was justly hailed as the father of his country by the people of the capital, but death followed close upon his triumphal reception (1333). "War against the Teutonic order" was the last advice of the king who had saved and reorganized Poland; peace was the foremost desire of his son Casimir III. the Great, who made it powerful and flourishing. He exchanged the eastern parts of Pomerania, which had been regained under Premislas, for some districts on the Vistula restored by the knights; ceded Silesia to Bohemia for a resignation of further claims, and secured the alliance of Hungary by adopting as successor his nephew Louis the Great, king of that country. Humane and enlightened above his age, though profligate, he earned the title of "king of the peasants," protected the Jews, had a double code of laws for both Polands promulgated by the diet of Wislica in 1347, and founded the university of Cracow, the first in northern Europe. But he also took care to strengthen and extend his power. He built cities and fortresses, and after the death without issue of Boleslas of Masovia, who reigned over Halicz, annexed his vast possessions to the Polish crown. To defend its rights to these provinces, he fought with varying success against Tartars, Lithuanians, and Wallachians. His death (1370) closed the long reign of the Piast dynasty, the first century of which (860–962) may be regarded as half historical, the following 180 years (nearly), from the accession of Miecislas I. to the death of Boleslas Crooked Mouth (1139), as a time of growth and conquests, the 180 years preceding the coronation of King Ladislas I. the Short (1319), as a time of division and decay, and the last period of 50 years as one of reconstruction and renewed expansion.—Louis of Hungary possessed the title, legally conferred by the diet, of Polish king, but hardly deserved it, his policy remaining exclusively Hungarian. He spent all his time in his native kingdom, and even commenced the annexation to it of the Haliczian territories. The legislative rights of the nobles, however, he confirmed and extended, being bent on securing the Polish succession to one of his two daughters, Mary and Hedvig. Of these, the younger, a girl distinguished by beauty as well as piety and mildness of character, was acknowledged after his death (1382), but long remained absent from Poland, which was in the meanwhile a scene of civil war. She finally arrived, and, following the advice of the Polish statesmen, gave her hand to Jagiello, grand prince of Lithuania, conquering not without a struggle an early love for an Austrian duke. The pagan prince was baptized as Ladislas (II.), and promised to convert his people, in which he was assisted by the zeal of Hedvig, and to unite his possessions with Poland. These, the limits of which had been extended by the conquests of his grandfather and father, Gedimin and Olgerd, from the Baltic and the Düna to the Dnieper and Black sea, comprised Lithuania proper, Samogitia (N. of the Niemen), Polesia (on both sides of the Pripetz), Volhynia, Podolia, and Ukraine, and in extent exceeded the territories of Poland, though surpassed by it in population, wealth, and culture. The promised union of the two powerful states was executed gradually and with difficulty. Jagiello, acknowledged as king of Poland (1386–1434), warred successfully against the Teutonic knights, routing them at Grünwald in 1410. His cousin Witold in vain conspired with the emperor Sigismund to make himself independent king of Lithuania under his protection. After the death of Jagiello, however, his elder son Ladislas III. was acknowledged only in Poland, the Lithuanians preferring to be ruled separately under the younger, Casimir. Both were still under guardianship. Ladislas was subsequently elected king of Hungary, and after a successful expedition against the Turks, and a favorable peace concluded under oath, which he was persuaded to break in the interest of religion, fell in a second campaign in the bloody battle of Varna in 1444. His brother Casimir IV. now reigned over both Lithuania and Poland. The first part of his long reign was mostly occupied by campaigns against the Teutonic knights, whose exactions drove the people of eastern Pomerania, or as it was now called Prussia, to rebellion, and in the peace of Thorn (1466) finally surrendered the territories of Dantzic, Culm, and Ermeland to Poland, keeping the eastern part as vassal of that crown. The Polish nobility, who by their bravery decided the protracted contest, simultaneously extended and regulated their rights and legislative privileges; the diets were organized by the institution of preceding district assemblies, and the introduction of regular representation; equality among the warrior class or nobles more and more prevailed; princely and other titles were despised, but family arms generally introduced; in Lithuania alone the higher nobility preserved their titles and oligarchic influence, and their pretensions and turbulent spirit caused numerous troubles, and even grave losses. The long wars were followed by a period of relaxation. Western Prussia, reviving after a dreadful devastation, became a great channel for foreign commerce; luxury, extravagance in dress, and refinement, and the use of foreign languages, including Latin, spread through all classes except that of the peasants. This latter class was still more oppressed during the following short reigns of the sons of Casimir, John (I.) Albert (1492–1501) and Alexander (1501–'6). The former made unsuccessful attempts to limit the sway of the nobles, and only aroused their jealousy and suspicions, an unexpected defeat in the forests of Bukovina during an expedition against Wallachia in 1496 being attributed by them to a plot aiming at their extermination. Under the latter the old and recent enactments, which had already concentrated almost all power in the two houses of the diet, the senate and the more powerful chamber of deputies, were digested in the form of a regular code by the chancellor Laski. Sigismund I., another son of Casimir IV., succeeded (1506–'48). Steady, diligent, active, and a friend of peace, he was the happiest king of his age. He was beloved by the whole people, and obeyed by even the turbulent nobility. The resources of the country were developed, and it attained an unprecedented prosperity, enjoying peace and order while almost the whole of Europe was distracted by wars resulting from religious dissensions or the ambition of princes. The conspiracy of Glinski, an ambitious Lithuanian, however, which was baffled, involved Sigismund in a war with Muscovy, in which Smolensk was lost, though Prince Constantine Ostrogski won a brilliant victory at Orsha. A large part of the Teutonic order having adopted the tenets of Luther, their last grand master Albert of Brandenburg, Sigismund's nephew, was established, as vassal of the latter, duke of eastern Prussia at Königsberg in 1525; the western part of that country, with Dantzic, remained in the immediate possession of Poland, under the name of Royal Prussia. A peace with the Turks, who had advanced to the northern shores of the Black sea, secured the suzerainty of Poland over Moldavia. The tranquillity of the good king was disturbed toward the close of his reign by petty political intrigues of his queen Bona, an Italian princess, and the undeserved complaints of the nobility, who, having been called out for an expedition to Wallachia, assembled in the vicinity of Lemberg, about 150,000 in number, declaimed against encroachments, drew up a list of grievances, and dispersed. Dying soon after, Sigismund left the throne to his son, Sigismund II. Augustus, an inexperienced youth, who had been trained to effeminacy by his mother. But in spite of many foibles, he proved a worthy successor of his father as soon as he was delivered from the maternal tyranny of Bona, who, after persecuting him for some time for having secretly married Barbara Radziwill, finally withdrew with her rich treasures to Italy. So circumscribed was already at that time the power of the king, that the affectionate husband was nearly compelled to sacrifice the crown to his love, and saved both only by timely directing the attention and jealousy of the lower nobility, the so called "younger brethren," to the abuses and encroachments of the higher, the "elder brethren." The reform of the republic, as the state was called, now became one of the principal objects of the diets, another being the final union of Lithuania with the crown. To achieve both the king and the nobles were indefatigable in their endeavors. The Lithuanian lords, however, who gloried in princely titles and enjoyed great feudal privileges, were slow in submitting to Polish equality; but Sigismund Augustus set a good example by sacrificing his own feudal as well as hereditary rights. After the death of Nicholas Radziwill the Black, one of its principal opponents, the union was proclaimed by the diet of Lublin in 1569. Ostrogski, Czartoryski, and other powerful Lithuanians signed it. Lithuania ceased to be a hereditary possession of the house of Jagiello, but was to form a common republic with Poland, under the rule of an elective king, with a common diet and senate. The two component parts, however, the grand principality and the crown, maintained their separate titles, armies, finances, and statutes. Podlachia, Volhynia, and Ukraine were transferred from the former to the latter.

Livonia, recently conquered by Sigismund Augustus from the knights sword-bearers, and defended against Ivan the Terrible of Muscovy, remained a common duchy. Warsaw in Masovia was chosen to be the regular seat of the diet. The power, prosperity, and opulence of the state approached their height. Peace promoted commerce, refinement, and the development of literature in both Latin and the vernacular Polish, which also gradually took the place of the Russian in the Lithuanian parts. Toleration and hospitality attracted foreigners of all sects, Lutherans, Calvinists, and Socinians, while western Europe was the scene of internecine religious strifes. The population of Poland was doubled under the two Sigismunds. But, a prey to disease, and to male and female favorites and charlatans, the younger died poor in rural solitude, and without issue, the last in the male line of the Jagiellos, the happiest of all the Polish dynasties (1572). During the interregnum which now followed, the cardinal rights of the nation were established, each elective head being required to enter into a regular covenant with it and to take the oath of fidelity to the *pacta conventa.* He was bound to convoke the diet every two years, to have a permanent council consisting of senators and deputies, to respect the rights of the dissidents, not to declare war or to send ambassadors abroad without the consent of the estates, and not to marry without that of the senate. An infraction of the compact was to absolve the people from allegiance. A diet of convocation, assembled by the archbishop of Gnesen as primate, preceded the diet of election, which was held on the field of Wola before Warsaw, every nobleman having an individual and equal elective vote. The archduke Ernest, a member of the then all-annexing house of Austria, and others found little sympathy; the choice fell upon the most unworthy candidate, the profligate Henry of Valois, duke of Anjou, brother of Charles IX. of France. A splendid embassy escorted the duke from Paris, and a splendid coronation took place at Cracow, in 1574; but the effeminate prince and the hardy nation were soon heartily disgusted with each other; and after a few months, having received the news of the death of Charles, he secretly ran off to France to succeed him as Henry III. Another Hapsburg, the emperor Maximilian II., appeared as candidate, and was even arbitrarily declared elected by the primate Uchanski; but the great statesman John Zamojski proposed to give the crown to Anna Jagiello, an elderly and virtuous sister of Sigismund Augustus, choosing for her husband Stephen Báthori, prince of Transylvania, and his advice prevailed (1575). This Transylvanian was probably the ablest monarch Poland ever had. A zealous Catholic himself, he was animated by a spirit of toleration toward others, and as a patron of science and friend of education founded numerous institutions, among others the university of Wilna, which he intrusted to the Jesuits. He reformed the judiciary, instituting independent high tribunals, strengthened the military forces of the country, secured the friendship of the Tartars around the Black sea, organized the Cossacks of the lower Dnieper as guardians of the S. E. frontier, and in a war against Russia humiliated Ivan and conquered Polotzk. His principal adviser and right arm was John Zamojski, who united the dignities of chancellor, castellan of Cracow, and hetman or commander-in-chief. Though a favorite also of the nation, he aroused the anger of the nobility against the king by an act of extreme though just severity, the execution of Samuel Zborowski, for murder and rebellious conduct; and Báthori, who frequently made use of Hungarian troops, was suspected of aiming at the subversion of the constitution and the establishment of a strong, hereditary monarchy, when he died. He closed the period of Poland's greatest power and prosperity, which, commencing with the accession of the house of Jagiello, lasted full 200 years. The independence of Poland survived this period for two more centuries, but these were a time of almost continual decay. Sigismund Vasa, the Swedish crown prince, who by his mother was a descendant of the Jagiellos, and an Austrian archduke, Maximilian, were the principal candidates after Báthori. Zamojski carried the election of the former, but his enemies the Zborowskis and their followers declared for the latter. The hetman, however, routed the archduke's troops, made him prisoner, and compelled him to resign. Still Sigismund, a friend of the Jesuits, whose Catholic zeal cost him his hereditary Swedish crown, entered into close alliance with Austria, like many of his predecessors marrying a princess of that house. His long reign (1587-1632) was distinguished by great men and numerous wars, but by no favorable results. In his first war against Sweden, where his uncle Charles IX. occupied the throne, he lost almost the whole of Livonia, in spite of Zamojski's successes and Chodkiewicz's brilliant victory at Kirchholm in 1605. Mniszech, Wisniowiecki, and others in vain sacrificed their men and riches to set the daughter of the former, Maryna, together with the Pseudo Demetrius on the throne of Moscow; the pretender fell by the Shuiskis in 1606; Zolkiewski, the heroic Polish hetman, took the latter prisoners, and had his king's son Ladislas crowned as czar in 1610; but Sigismund, who aimed at converting Russia, spoiled the affair by a separate expedition, and all but Smolensk and Severia was lost again. Zamojski successfully interfered, at his own expense, in the affairs of Moldavia, but other powerful nobles who followed his example were made captives by the Turks. Zolkiewski conquered peace from the Turks, but fell in a new war at Cecora in 1620. Chodkiewicz revenged his death at Chocim, where he closed his glorious career in 1621. In anther war against Sweden, when Sigismund counted, but in vain, on Austrian and Spanish aid against the common enemy Gustavus Adolphus, not only was Livonia not reconquered, but Riga was lost (1621), the Polish fleet on the Baltic destroyed, and a part of Prussia given up by a truce in 1629. In internal affairs Sigismund was not more successful; the Greeks and other dissidents complained, conspired, or rebelled, the regular army extorted its arrears by mutiny, and the royal dignity was more than once humiliated. Sigismund's brave son, Ladislas IV. (1632–'48), defended Smolensk against Russia, and regained Prussia in a peace concluded with Sweden in 1635, but in domestic concerns was not more fortunate than his father. Having by some intended reforms caused suspicion among the nobility, he had to submit to further limitations of the regal authority. The dominant class, the turbulent warrior brotherhood, now exercised its sway in every direction, tyrannically disabling the king, prohibiting superior titles, entirely excluding the non-nobles from all legislative influence, and more and more burdening and degrading the peasantry. Similar oppression, as well as religious persecution, was now begun against the Cossacks, which at the time of Ladislas's death resulted in a dreadful rising under Chmielnicki, who, aided by the Tartars, carried death and desolation into the very heart of Poland, alternately conquering and conquered in battles, extorted treaties and submitted to others, and finally subjected the rebellious warriors to the czar of Moscow. This war and defection, next to the spirit of religious intolerance which cursed the reign of the Vasas the principal cause of Poland's rapid decay, was only one of the calamities which befell the brother and successor of Ladislas, the religious and brave but fickle John (II.) Casimir (1648–'68). Some he caused himself by injustice, as the treason of Radziejowski, and the fatal insurrection under Lubomirski; but the chief sources of misfortune were legislative anarchy, culminating in the *liberum veto*, or the right of a single deputy to prevent or annul the action of the diet, internal dissensions, and the readiness of neighboring powers to profit by them, which made John Casimir prophetically predict in the diet the future dismemberment of the country by Brandenburg, Austria, and Russia. In his own reign, simultaneously assaulted by the Russians and Cossacks, Charles Gustavus of Sweden and his ally the great elector of Brandenburg, and George Rákóczy of Transylvania, Poland was on the brink of ruin; the new capital, Warsaw, as well as the old, Cracow, fell into the hands of the Swedes, Wilna and Lemberg into those of other enemies; the king was deserted, and fled to Silesia. The fortified convent of Czenstochowa, however, was saved by the patriotism of the friars; a confederation for defence was formed at Tyszowce by the Potockis, Lanckoronski, and other patriots; heroic efforts were made, John Casimir returned, the king of Denmark proved a useful ally, and the sword of Czarniecki was victorious everywhere and against all enemies, from Cracow to Slonim, and from the coast of Denmark to the shores of the Black sea. Peace was conquered, but at great sacrifices. Ducal Prussia was definitely ceded to Brandenburg, almost all Livonia to Sweden, and Smolensk, Severia, Tchernigov, and Ukraine E. of the Dnieper to Russia, by the treaties of Wehlau, Oliwa (1660), and Andrussow. Poland was half a desert. John Casimir, despairing of the future, resigned, and retired to an abbey in France, where he died. Michael Korybut Wisniowiecki was elected his successor. He was the son of a commander who made himself terrible to the Cossacks in the wars of the preceding reign, but himself possessed neither distinction, nor wealth, nor confidence in his own abilities, and had almost to be compelled to accept the crown. The primate and the hetman John Sobieski openly and secretly agitated against him; and when on an incursion of the Turks, in which they overran Ukraine and Podolia and captured Kamieniec (1672), he concluded with them a shameful peace, Sobieski caused its rejection by the senate, immediately hastened to the seat of war, and routed the Moslems at Chocim (1673). Michael dying about the same time, the hero repaired to the diet at Warsaw, was himself elected his successor, returned to meet the foe, and relieved the hard-pressed fortress of Trembowla. In another campaign, however, he was surrounded by the Turks and Tartars at Zurawno and barely saved his army, ceding Kamieniec and a part of Ukraine in a treaty. At the instigation of his ambitious and intriguing French queen, he again took up arms against the Turks in 1683, when he delivered Vienna and filled Christendom with the fame of Polish arms, but obtained no benefit for his own country. Equally fruitless were his later undertakings, and he died little beloved by his people in 1696. His sons found no support at the election; the diet was divided, and two foreigners, the prince of Conti and the elector of Saxony, Augustus (II.), were elected by the opposing factions. The elector arrived before Conti, and prevailed. His friendly relations with the court of Vienna enabled him to regain Kamieniec, without a war, through the treaty of Carlowitz (1699); but his alliance with Peter the Great of Russia and Frederic IV. of Denmark, against the young Charles XII. of Sweden, proved a source of calamities to himself and the country. The Saxons fought Augustus's battles, and the Poles, who had not been consulted about the war, were little inclined to aid him. Charles, having humbled the Danish king at his capital, and routed the czar at Narva in 1700, drove back the Saxons from the Düna, marched through Lithuania, where he was received with open arms by the Sapiehas, who were just engaged in a bloody feud against other families of the grand principality, crossed over to Poland, entered Warsaw, defeated Augustus at Klissow in 1702, and occupied Cracow. The young conqueror preferred giving away the crown of Poland to taking it himself, and had his friend, the youthful and noble-hearted palatine of Posen, Stanislas Leszczynski, substituted for the voluptuous Saxon (1705), whom he pursued into his hereditary electorate, where by the treaty of Altranstädt in 1706 he compelled him to resign his claims to Poland. But scarcely had Charles lost the battle of Pultowa (1709), when Augustus returned, and with the help of the Russians recovered the regal crown. Stanislas joined his protector in Turkey. The following period of peace was one of public and private corruption. The nobility was infected by the effeminacy of the court, and abandoned the defence of constitutional rights; religious fanaticism not only occasionally showed itself, as at Thorn in 1721, in a bloody shape, but also legalized the long exercised exclusion of the dissidents from office; and Russian interference became permanent. A Russian army helped a faction of the nobles to establish the son of Augustus as his successor in 1733, instead of the reëlected Leszczynski, who was compelled to retire to Dantzic, where he was besieged, and thence to escape in disguise. Louis XV. of France, who had married the daughter of Leszczynski, commenced a war of Polish succession on the Rhine, at the termination of which the latter received the duchy of Lorraine, but Augustus III. remained on the throne of Poland, continuing in peace the enervating misrule of the preceding reign. During the 7 years' war Russian armies crossed and recrossed the country without opposition. Constitutional anarchy made legislation almost impossible. But already the more enlightened of the nation, seeing the depth of degradation into which the country was sunk, began to think of vital reforms. Not only was the *liberum veto* attacked by the great Piarist Konarski and others, but monarchical opinions too gained considerable ground. To transform the republic of the nobles into a regular constitutional kingdom became the scheme of Michael and Augustus Czartoryski and their friends. In order to conquer the opposition of Radziwill, the Potockis, and other adherents of the old republican constitution, they secretly sought the aid of Catharine II. of Russia, who readily but treacherously granted it. After the death of Augustus III. in 1763, Stanislas Augustus Poniatowski, a favorite of the empress, and nephew of the Czartoryskis, was illegally placed upon the throne by a confederation of the reformers, aided by Russian bayonets. The regal prerogative was somewhat enlarged. The commencement of the new reign was splendid and promising. But Poniatowski, though enlightened, good-natured, and a friend of progress and literature, was feeble to fickleness, and allowed himself to be used as a tool by the designing empress. Her ambassador, Repnin, who had an army at his disposal, became the real ruler. He encouraged the dissidents and enemies of reform, who formed numerous small confederations, united them into one at Radom, and by force of arms compelled them to accept the guaranty of the unlimited republican liberty by Russia. To silence the indignation of the people, he had the patriotic bishops of Cracow and Kiev, Soltyk and Zaluski, and the palatine of Cracow, Rzewuski, with his son, arrested in the night, and sent as prisoners to Russia in 1767. The patriots, however, now took up arms in defence of independence and liberty, against foreign aggression and regal usurpation, but unhappily also against the influence of the dissidents. The confederation of Bar took the lead (1768), its soul being the Pulaskis (properly Pulawskis), especially Casimir, and Krasinski, bishop of Kamieniec. The struggle against the Russians, the Porte too declaring war against them, was carried on long and fiercely in various parts of the country, but only by a part of the nobles, under Pulaski, Sawa, Charles Radziwill, Zaremba, Kosakowski, Oginski, and others. An attempt in 1771 to carry off the king from the capital failed when almost executed, and brought great odium upon the confederates. Meanwhile Catharine concerted a division of Poland with Frederic the Great and Maria Theresa. The Prussians and Austrians entered Poland in 1772; the confederates, already greatly weakened, dispersed, and the dismemberment of the country began. A diet was convoked in 1773 to sanction the deed; but few of the members appeared, and these remained silent. Russia took the palatinates of Polotzk, Vitebsk, and Mstislav, and some adjoining parts; Prussia, the Polish province of that name, with the exception of the towns of Thorn and Dantzic, and a part of Great Poland on the Netze; Austria, Red Russia, a part of Podolia, and parts of Little Poland between the Vistula and the Carpathians, uniting all under the name of Galicia and Lodomeria. The old constitution with all its abuses was fastened upon the remaining territories of Poland, under the guaranty of Russia. To save and strengthen the country by reforms now became a general tendency, and in a short time an immense progress was achieved in culture, literature, commerce, industry, and legislation. The general reform of the state was the task of the double diet of 1788–'92, called the great or long diet, and presided over by Malachowski and Sapieha, which by a new constitution, first promulgated May 3, 1791, and most solemnly adopted by the king and the people, abolished the *liberum veto*, gave political rights to the cities and civil rights to the peasantry, and made the throne hereditary, offering the succession to the elector of Saxony. Frederic William II. of Prussia encouraged the reformers, and offered his aid against Russia. But the aid of Catharine II. was invoked by the defenders of the old constitution, who under the lead of Felix Potocki, Francis Xavier Branicki, and Severin Rzewuski, in 1792 formed the confederation of Targovitza against the new order of things. The Russians entered Poland; the Polish army, commanded by Joseph Poniatowski, the nephew of the king, retreated to the Bug; the arrival of the king in person was waited for in vain; Prussia proved traitorous, and Kosciuszko's glorious fight at Dubienka (July 17) was useless. After long wavering, the king virtually ended the struggle by going over to the confederation; the Russians occupied the capital, and a diet convened by the victors at Grodno in 1793 was compelled at the point of the bayonet to sanction a new division of the country. The ostensible defender of the old "republican liberty," Catharine, with her own hand drew a line on a map across Lithuania and Volhynia, taking all the land E. of it; the late ally of Poland, Frederic William, secured himself against "Polish Jacobinism" by taking the remainder of Great Poland and the towns of Thorn and Dantzic. The despair of the nation broke out in a great insurrection in 1794, for which the brigadier Madalinski gave the first signal. Kosciuszko was called from abroad to lead it as dictator, and, appearing at Cracow, hastily armed the people of the vicinity, partly with pikes and scythes, and routed the Russians at Raclawice (April 4). The Russian garrison at Warsaw, commanded by Igelström, was soon after almost annihilated by a revolt of the inhabitants under the lead of the shoemaker Kilinski; a supreme council was formed, embracing among others Ignatius Potocki and Kollontaj; Lithuania rose under Jasinski; numerous scattered detachments of troops flocked to the banner of Kosciuszko; the king was ignored. But the means of the exhausted country were scanty, arms were wanted, unanimity could not be produced, and the Russians were soon joined by Prussian and Austrian armies. Kosciuszko was defeated at Szczekociny, and Zajonczek at Chelm. Warsaw was besieged by Frederic William in person, and distracted by popular outbreaks of rage against real or presumed traitors; and though it was saved by a rising, under Mniewski and Dombrowski, in the rear of the Prussians, Kosciuszko was no longer able to prevent the junction of the Russian corps under Suwaroff and Fersen, and in the bloody battle of Maciejowice (Oct. 10) was taken prisoner. The storming and massacre of Praga and the capitulation of Warsaw (Nov. 8) followed; the Polish troops were disbanded; most of the commanders and numberless other patriots were dragged into captivity; and Poniatowski resigned his crown at Grodno in 1795, and died brokenhearted at St. Petersburg (1798). The third division annihilated the existence of Poland, effacing even its name. Russia took all the provinces E. of the Niemen and Bug; Austria those between the latter river, the Pilica, and the Vistula; Prussia all the remainder, with its capital. But scarcely had the last dismemberment been consummated, when the surviving patriots commenced making new endeavors for the restoration of their national independence. Secret conferences took place in the Polish provinces, and committees were appointed abroad, the principal being at Paris and Venice. Oginski and others invoked the help of France, Turkey, and Sweden, and Dombrowski succeeded in forming in revolutionized Italy Polish legions, whose bravery soon rivalled that of the most renowned French troops under the banners of Napoleon. After 10 years' glorious service abroad they victoriously reëntered their native land. By the treaty of Tilsit (1807) Napoleon transformed the greater part of the Prussian share of Poland into a duchy of Warsaw, which received a tolerably liberal constitution, and a ruler in the person of the king (formerly elector) of Saxony, Frederic Augustus. This little Polish state made immense exertions in behalf of its French ally and protector, and the Polish armies under Prince Joseph Poniatowski, Dombrowski, Zajonczek, Chlopicki, and others, shed their blood profusely not only on their own soil, as in the last war against Austria (1809), when the duchy gained a large part of western Galicia, but also in Spain and elsewhere, and especially in the great Russian campaign of 1812, which promised the restoration of the whole of Poland. This hope soon vanished with the reverses of the grand army, and the duchy itself was destroyed in 1813, after a gallant resistance by the fortresses of Zamosc, Modlin, and Thorn. Poniatowski perished in the Elster at the close of the battle of Leipsic, but the remnants of the Polish troops fought to the last with the retreating emperor, and some followed him even to Elba. The territorial limits of divided Poland were now rearranged by the congress of Vienna, which, while creating a shadow of Polish independence in the miniature republic of Cracow, naturally gave the lion's share to Alexander of Russia. The czar, flushed with victory and popularity, formed his new acquisitions, extending from the Niemen and Bug to the Prosna, into the present so called kingdom of Poland, to which he gave a constitution guaranteeing a biennial diet, composed of a senate for life and a chamber of deputies, a separate responsible ministry, an independent judiciary, a national army of 50,000 men, and the freedom of the press. Of this separated and privileged part of his vast Polish possessions the czar was the king, and his brother Constantine, its military governor and generalissimo, the virtual viceroy, Gen. Zajonczek being the nominal. Most of the surviving Polish officers of the Napoleonic armies took service in the national ranks. But the harmony between the foreign rulers and the people could be but superficial, and even as it was but of brief duration. Mutual distrust prevailed from the beginning; the opposition to the measures and projects of the government gained strength from diet to diet; violations of the constitution grew frequent, as the more or less sincere liberalism of Alexander declined as he grew older; Constantine tortured the army by excessive drilling, and drove the best officers from its ranks and into hostility by outrageous insults; secret patriotic affiliations were formed in various Polish provinces by Dombrowski, Uminski, Lukasinski, Zan, Krzyzanowski, and others; numerous victims of the terribly organized secret police were thrown into dungeons or transported to Siberia; and after the accession of Nicholas (1825) there could be no longer any doubt that an open rupture was only a matter of time. Nevertheless the outbreak at Warsaw, precipitated by a small band of youthful democratic conspirators under Peter Wysocki, which drove Constantine and the Russians in the night from that capital (Nov. 29–30, 1830), took both the emperor and the nation by surprise, though ensuing 4 months after the revolution of July in Paris. The whole people immediately declared in favor of the revolution, but the aristocrats took the lead with the intention of moderating its course. To this party belonged the patriotic Prince Adam Czartoryski, president of the provisional government; the old poet Niemcewicz, formerly Kosciuszko's companion in arms in America and Poland; the minister Lubecki, a man of dubious patriotism; Chlopicki, for a short time dictator (Dec. 1830, Jan. 1831); his successors in the chief command of the army, Radziwill, Skrzynecki, Dembinski, and Casimir Malachowski; and the generals Dwernicki, Chrzanowski, Bem, Uminski, Rybinski, Prondzynski, and others. The agitations of Lelewel, Mochnacki, and other democrats, in the diet or clubs, had no other result but an increase of difficulties, and finally fatal disorder. Much precious time was wasted in attempted negotiations with Nicholas; the ardor of the masses was checked by too long continued observance of constitutional and territorial limits; the peasantry was left in its degraded condition; the army increased slowly; the sending of troops into Lithuania, which was anxious to rise, was delayed until it was too late; and a powerful Russian army under Diebitsch was allowed to cross the Bug without resistance, and to approach the capital. The independence of Poland and the exclusion of the house of Romanoff having been declared (Jan. 25), a series of bloody battles was fought mostly in the vicinity of Warsaw, especially at Dobre, Wawre, and Grochow, and at Stoczek, in February, again at Grochow in March, at Iganie in April, and on the middle Narew and Bug and at Ostrolenka in May, in which the personal courage of the Polish commanders was far more conspicuous than their strategetic talents. The bravery of soldiers, of whom a part could be armed only with scythes, never shone brighter in any other contest. But the time of dearly purchased victories and glorious defeats was now over; Dwernicki, sent to revolutionize Volhynia, had been compelled to retire into Galicia, and there to surrender to the Austrians; another corps, sent under Gielgud and Chlapowski to the assistance of the Samogitian and Lithuanian insurgents, shared the same fate on Prussian territory in July, Dembinski alone saving his detachment by an admirable retreat; the main army remained inactive around the capital, allowing the new Russian commander-in-chief Paskevitch to cross the lower Vistula on the Prussian frontier, and to advance toward Warsaw on the left bank of that river. The people growing impatient, Skrzynecki was deposed, presumed traitors were massacred in a night of horrors (Aug. 15), and Krukowiecki succeeded Czartoryski as president of the government, but the management of affairs grew even worse than before. Ramorino having been sent to the S. E. with a part of the Polish army, Paskevitch finally attacked the fortified capital, and after a murderous struggle, during which Krukowiecki negotiated, a capitulation virtually ended the war (Sept. 8). The main army under Rybinski, accompanied by the government under Niemojewski, laid down its arms on Prussian territory; Ramorino in Galicia, a corps under Rozycki at Cracow, and the fortresses of Zamosc and Modlin surrendered. Depopulated at once by the sword and by the no less frightful ravages of cholera, the country lay bleeding and exhausted at the feet of the czar, and mercy was neither expected nor exercised. Numberless patriots were sent to Siberia and other places of confinement, the private soldiers compelled to serve in the Russian army, the estates of refugees confiscated, the constitution and the laws of the country abrogated, the university of Warsaw and other principal schools abolished, the rich literary collections carried to St. Petersburg, all marks of nationality prohibited, the most rigorous censorship of the press and a terrible police system introduced, a citadel at Warsaw and other new fortifications erected, the most arbitrary measures taken to denationalize and Russianize the people, and new attempts at insurrection in 1833 and 1846 punished with the gallows. This system was continued throughout the reign of Nicholas, though at times moderated by the milder disposition of the governor, Paskevitch. The same denationalizing policy was zealously prosecuted in all other Polish provinces of Russia, Prussia, and Austria; the republic of Cracow alone preserved for some time its nationality. In the meanwhile the Polish emigrants, residing mostly in France, and embracing the most distinguished men of the nation, though split into violently opposing factions, were unremitting in their endeavors to pave the way for a restoration of their country. The democratic party, consisting chiefly of the younger generation, partook in numerous revolutionary movements in western Europe, and fomented conspiracies in Poland. The most extensive and best organized of the latter, led to simultaneous outbreaks in Russian Poland, Galicia, Cracow, and Posen (Feb. and March, 1846). All ended disastrously. The leaders in Poland were hanged, those in Posen, Mieroslawski and others, imprisoned, and the patriotic nobles of Galicia butchered by the peasants; the republic of Cracow, where alone the insurrection was for a short time successful, was abolished and annexed to Galicia. Mieroslawski and his associates, being saved from death by the revolution of Berlin in March, 1848, fought soon after, with hastily collected Polish bands, bravely but unsuccessfully, against overwhelming Prussian forces in Posen; Bem, Dembinski, and Joseph Wysocki commanded Hungarian armies and Polish volunteers against Austrians and Russians in 1848–'9; Czajkowski and others fought against the latter in the Turkish war; but all those efforts directly or indirectly to benefit Poland from abroad remained fruitless. At home, however, considerable ameliorations took place in the Russian Polish provinces after the accession of Alexander II. (1855), numerous refugees returned, and new reforms were hoped for, when a gradually increasing agitation and lively popular demonstrations at Warsaw on Feb. 27 and April 8, 1861, induced the new governor, Gortchakoff, after some concessions, to employ the military force, and a large number of lives were sacrificed. Similar demonstrations and more or less serious collisions took place in other parts of the country. Simultaneously a Polish diet was convened at Lemberg (April 15), Austria having been compelled by the consequences of the Italian war of 1859, and especially the new movements in Hungary, to grant constitutions to its various provinces.—Among the principal works on the history of Poland are, in Polish, those of Naruszewicz, Niemcewicz, Bandtke, and Lelewel; and of Oginski, Rulhière, Salvandy, Bronikowski, Soltyk, Brzozowski, Roepell, Mieroslawski, and L. Chodzko in other languages.

POLAND, LANGUAGE AND LITERATURE OF. The Polish language belongs to the northwestern group of the Slavic division of Indo-European tongues. Its principal dialects, though not materially differing from each other, are those of Masovia, Little Poland and Galicia, Lithuania, and Great Poland, beside the more degenerate Silesian. The alphabet consists of the following letters: *a* (short Italian *a*), *ą* (French *on*), *b*, *ḃ* (soft, like Eng. *by*, both consonant), *c* (*ts*), *ć* (*tch*, very soft), *cz* (*tsh*), *ch* (*ch*, Ger. *ch*), *d*, *e* (short Italian), *é* (compressed, as in *yes*), *ę* (Fr. *in*), *f*, *g* (hard), *h*, *i* (short Italian), *j* (*y* consonant), *k*, *ł* (*l*, very hard), *l* (It. *gl*), *m*, *n*, *ń* (Fr. *gn*), *o* (short Italian), *ó* (compressed, approaching *u*), *p*, *ṗ* (soft, like *py*, both consonant), *r*, *rz* (Fr. *rj* in one), *s*, *ś* (*sh*, very soft), *sz* (*sh*), *t*, *u* (short Italian), *w* (*v*), *x*, *y* (resembling the Ger. ü), *z*, *ż* (Fr. *j*), *ź* (Fr. *j*, very soft). *I* serves to soften various consonants, replacing the ´: *drób*, little poultry, gen. *drobiu*; *żyć*, to live, *życie*, life; *koń*, horse, gen. *konia*; *wieś*, village, gen. *wsi*. The accent, except in foreign words and in compounds, is constantly on the penultimate: *rodak*, countryman, gen. *rodaka*, dat. *rodakowi*. As in Latin, there is no article: *cnota*, virtue, a virtue, the virtue. There are 7 cases of declension, nominative, genitive, dative, accusative, vocative, instrumental (*mieczem*, by or with the sword), and locative (after certain prepositions, as *w Bogu*, in God). The forms of declension depend upon the termination, the gender, and the kind, words of the same termination denoting persons, animals, and lifeless objects having in the masculine severally different forms. The gender of nouns is mostly determined by the termination. There are three genders for nouns, adjectives, pronouns, verbs, and participles, as: *Mój dobry kochany ojciec pisał*, My good beloved father wrote; *Moja dobra kochana matka* (mother) *pisała*; *Moje dobre kochane dziecko* (child) *pisało*. The following may serve as examples of the declension of nouns and adjectives in the masculine and feminine singular: *wielki las*, (a, the) large forest, *wielkiego lasu*, *wielkiemu lasowi*, *wielki las*, *wielki lesie!*, *wielkim lasem*, (*w*) *wielkim lesie*; *wielka rzeka*, (a, the) large river, *wielkiej rzeki*, *wielkiej rzece*, *wielką rzekę*, *wielka rzeko!*, *wielką rzeką*, (*w*) *wielkiej rzece*. The comparative degree is formed by the syllable *szy* (nom. mas. sing.), the superlative by *naj* and *szy*, thus: *stary*, old, *starszy*, older, *najstarszy*, oldest; *mocny*, strong, *mocniejszy*, *najmocniejszy*. The numerals distinctly betray a pure Indo-European derivation: *jeden* (Sans. *eka*, compare also the Heb. *echad* and the Hung. *egy*), *dwa* (Sans. *dva*, Gr. *δύο*, Lat. *duo*), *trzy* (Sans. *tri*, Gr. *τρεῖς*, Lat. *tres*), *cztery* (Sans. *tchatur*, Lat. *quatuor*), *pięć* (Sans. *pantchan*, Gr. *πέντε*), *sześć* (Sans. *shash*, Lat. *sex*, comp. Heb. *shesh*), *siedm* (Sans. *saptan*, Lat. *septem*, comp. Heb. *sheba'*), *ośm* (Sans. *ashtan*), *dziewięć*, *dziesięć* (Sans. *das'an*, Lat. *decem*), *sto* (Sans. *s'ata*, Lat. *centum*), *tysiąc* (*thousand*). The verb is exceedingly rich in forms, serving to express frequency, intensity, inception, duration, and other modes of action or being. The formatives consist chiefly of prepositions and other particles, as in German, thus: *znać*, to know, Ger. *kennen*; *poznać*, to recognize, Ger. *erkennen*; *rwać*, to tear, *wyrwać*, to snatch, Ger. *entreissen*; *rozerwać*, to tear asunder, Ger. *zerreissen*; *rozrywać*, long or frequently to tear asunder; *porozrywać*, to tear asunder to the last. *Ć* marks the infinitive, *ł* the past: *znam*, I know, *znać*, to know, *znałem*, I knew; the persons are distinguished by the termination: *znam*, I know, *znasz*, thou knowest, *zna* (he, she, it) knows, *znamy*, *znacie*, *znają*, we, you, they know. Diminutives, denominatives, and other derivatives, are abundant. Compounds are rare. The words of a sentence can be arranged almost as freely as in Latin, misunderstanding being precluded by the distinctness of the formative terminations. In flexibility, richness, power, and harmony the Polish is hardly excelled by any other language of Europe; its grammatical structure is fully developed and firmly established, its orthography precise and perfect. The principal grammars are by Kopczynski, Mrongovius, Bandtke, Mrozinski, Poplinski, and Muczkowski (Cracow, 1845); the principal dictionaries by Linde, Bandtke, Mrongovius (Königsberg, 1835), and Trojanski (Posen, 1835–'46).—The oldest remnants of Polish literature consist of proverbs, popular songs and tales, and a religious song in praise of the Virgin (*Boga rodsica*) attributed to St. Adalbert (Sty. Wojciech), who lived in the time of the first Christian monarch of Poland, toward the close of the 10th century. The Latinizing influence of Christianity, and of the universities of western Europe, which were generally frequented by the Poles, prevented the development of a national literature in Poland during the middle ages; and all the literary productions of that period, as well as the laws of the country, were written in Latin. Among the most important of the former are the chronicles of Martin Gallus (about 1130), Kadlubek (1220), Boguphalus (1250), and Martin Skrzenbski, surnamed Polonus (1270), and the celebrated "History of Poland" by Dlugosz (1480). The principal centre of scholarship and science was the university of Cracow, the first foundation of which was laid by Casimir the Great (1347), and which among its teachers and alumni counted some of the most distinguished scholars of Europe, among others Copernicus, whom Poland claims as its son and citizen. The first Polish printing press was established at Cracow toward the close of the reign of Casimir IV. (1490). Among its earliest productions is the great collection of Polish laws by the chancellor of King Alexander, John Laski (1506). In the succeeding reigns of Sigismund I. and his son Sigismund Augustus, the last two of the Jagiellos (1506–'72), Polish literature was first and rapidly developed, the 16th century being regarded by many as its golden age. The poetical style especially rose to an astonishing degree of perfection. The satirist Rej (born 1515), and John Kochanowski, the great lyrical poet (1532–'84), are both called the fathers of Polish poetry. Of the two younger brothers of the latter, Peter translated Tasso's "Jerusalem Delivered," and Andrew Virgil's Æneid. The poets Szarzynski, Rybinski, Klonowicz, Miaskowski, and Grochowski were contemporaries of the Kochanowskis. The reformation, which found an easy spread in Poland, caused numerous translations of the Bible into the national language, for Lutherans and Socinians as well as for Catholics. Among the theologians of that age the great Catholic pulpit orator Skarga (died 1612), and the Protestant author Niemojewski, deserve particular mention. Martin and his son Joachim Bielski, in the latter part of the 16th century, wrote a *Kronika polska*, Górnicki (1535–'91) *Dzieje w koronie polskiej* ("History of the Polish Crown Lands"), Stryjkowski (died 1582) a "Chronicle of Lithuania," and Paprocki (died 1614) works on heraldry. Others wrote in Latin: Orzechowski the *Annales Poloniæ*; Kromer, archbishop of Ermeland (died 15[illegible]), *De Origine et Rebus Gestis Polonorum*. Szymonowicz (Simonides), an author of celebrated Latin odes, and of equally excellent Polish idyls (*Sielanki*), and Zimorowicz, his rival in the latter species of composition, flourished during the reign of Sigismund III. (1587–1632); but in the second half of that reign Polish literature began rapidly to decline. The Latin was the principal object and medium of instruction. The disastrous wars and civil strifes of that and the following reigns of the Vasa dynasty exercised a pernicious influence. Sobieski restored only the glory of Polish arms, and the succeeding Saxon rule inaugurated a period of general relaxation. During a century and a quarter pedantry, bad taste, and impurity of language prevailed. Of the better poets of that epoch may be mentioned the Jesuit Sarbiewski (Sarbievius, died 1640), who wrote in Latin odes and earned the title of the Sarmatian Horace; Opalinski, a writer of satires (died 1655); Twardowski (died 1660); Kochowski, who accompanied John Sobieski to Vienna, and in *Wieden wyzwolony* ("Vienna Delivered"), an epic, sang the glory of his hero; Bardzinski; Morsztyn, the translator of Corneille; and Elizabeth Druzbacka (1687–1760), whose *Pochwala lasu* ("Praise of the Woods"), *Cztery pory roku* ("The Four Seasons of the Year"), &c., appear as the precursors of a better literary age. The historians wrote mostly in Latin: Piasecki (1585–1649) a liberal history of his times (*Chronicon Gestorum in Europa*); Starowolski (died 1656), among other works, a *Status Regni Poloniæ Decriptio*; Kojalowicz (died 1677) an excellent *Historia Lithuaniæ*; Fredro (died 167[illegible]) his *Fragmenta*; Andrew Wengierski (died 16[illegible]), and Lubieniecki (died 1675) histories of the reformed church in Poland. Among those who contributed most to the introduction of a better era were the brothers Joseph and Andrew Zaluski; the former, who was bishop of Kiev (died 1774), especially by the collection of a library of more than 200,000 volumes. More powerful still was the influence of the great reformer of public education, the Piarist Konarski (died 17[illegible]). The courts of the exiled king Leszczynski in Lorraine, and of Poniatowski in Warsaw, as well as the residences of the princes Czartoryski and Jablonowski, were centres around which the representatives of reform in politics, social life, education, literature, and science grouped themselves. The politically unhappy reign of Poniatowski, the last king of independent Poland, thus became in a literary point of view the most distinguished. Piramowicz wrote for schools; Bohomolec translated French dramas; Trembecki, Kniaznin, and Wengierski composed fine lyrical or descriptive poems; Naruszewicz a great "History of Poland" and an admirable translation of Tacitus; and the genial Krasicki miscellaneous works in verse and prose, by which he merited the distinction of being called the Voltaire of Poland. This purified literary activity survived the divisions and fall of Poland. The poets Godebski Wenzyk, author of *Okolice Krakowa* ("The Environs of Cracow"), and Dmochowski, the dramatists Felinski, Kropinski, Osinski, and Boguslawski, and the eminent historical or political writers Czacki, Albertrandy, Kollontaj, Stanislas Potocki, Ossolinski, and Staszyc, belong principally to the beginning of the present century. The most popular poets of the next following period were Karpinski, Brodzinski, Woronicz, and especially Niemcewicz, who was also distinguished as a historian, and in his ballads (*Spiewy historyczne*) surpassed all his predecessors. He was, however, soon after himself surpassed in epic poetry by Mickiewicz, the founder of the romantic school of Polish poetry, around whom numerous young disciples grouped themselves at Wilna. To the romantic school belong most of the more recent poets of Poland, many of whom wrote, after the revolution of 1831, in exile; the Ukrainians Malczewski, author of the admirable epic "Maria," Goszczynski, Zaleski, and Padura; Odyniec, author of the drama of *Izora*; Korsak, who wrote elegiac poetry and lyrics; Alexander Chodzko, translator of Persian and other oriental poetry; Gorecki, Siemienski, Garczynski, Bielowski, Julius Slowacki, Groza, Krasinski, and numerous others. Novels were published in the earlier part of this century by Niemcewicz (*Jan Tenczynski*), Maria Czartoryska (*Malvina*, originally in French), Bernatowicz (*Nalecz*, *Pojata*), and Skarbek, and more recently by Grabowski, Czajkowski (*Wernyhora*, *Kirdzali*, *Czarniecki*), and especially Kraszewski. Dramas have been written by Skarbek, Kaminski, Fredro, Magnuszewski, and others; the best historical works, beside Lelewel, by Bandtke, Maciejowski, Narbutt, Eduard Raczynski, Plater, and Lukaszewicz; the most popular educational works by Clementina Tanska-Hoffmann; and philosophical works by Sniadecki, Trentowski, and Libelt. The most important works on Polish literature are by Mochnacki, Muczkowski, Bentkowski, Ossolinski, Chodynicki, Wiszniewski (*Historya literatury polskiej*, 7 vols., Cracow, 1840-'46), and Lukaszewicz (Posen, 1849).—The centres of Polish literary activity, and especially of periodical literature, are Warsaw, Wilna, Posen, Cracow, Lemberg, and Paris, the latter city as the principal seat of the Polish emigration. Warsaw, however, in spite of very severe restrictions on the press, has always maintained a decided preëminence over all its rivals, as the literary no less than political metropolis of Poland.

POLAR EXPEDITIONS. See ANTARCTIC RESEARCHES, ARCTIC DISCOVERY, and MACCLINTOCK, SIR FRANCIS LEOPOLD.

POLARIZATION OF LIGHT, a change that may be produced in the rays of light, such that they appear to have acquired different properties on different sides, and so that they are no longer like common light in being reflected or transmitted indifferently in all positions of the polished or transparent surfaces on which they may impinge. The subject includes double refraction, which is one of the chief means of producing polarization. The phenomena of polarized light are justly regarded as the most curious in the science of optics; but the subject has become so extensive and complex, that it can be presented fully only in the larger special treatises of optical science. See Sir D. Brewster's "Treatise on Optics" (new ed., London, 1853), and Pereira's "Lectures on Polarized Light" (London, 1854).—Common light, as that from a candle or gas flame, and in a degree that of the direct sunbeam, can, by properly presenting an opaque mirror in its course, be mainly reflected, and equally well up, down, to right or left. But a perfectly polarized beam, if reflected best up or down, *i. e.*, in a vertical plane, is totally extinguished if the mirror be then so turned as to throw it to right or left, *i. e.*, in the horizontal plane, and *vice versa*. The ray of light here behaves as if it were flattened, and accordingly is differently affected as it strikes flatwise or edgewise on the surface of a mirror or medium. There are several varieties or degrees of polarization, the names of which have been given with reference to the undulatory theory. (See LIGHT.) To account, by that theory, for the phenomena of polarization, a ray of common light must be considered as being propagated by vibrations that are transverse to the course of the ray, the particles of ether moving in curves that have the form of ellipses, and a great number of these ellipses being described at once or successively in all possible directions crossing the path of the ray. But by impingence of a ray so vibrating on a reflecting surface, or its passage through some medium, we can readily suppose the forces acting on the molecules to be resolved in some way, so that, first, all the varying elliptical movements shall be reduced to two sets of rectilinear movements, crossing each other, as well as the path of the ray, transversely, and hence vibrating in two planes at right angles to each other, when the common or heterogeneous ray is resolved into two rays, plane-polarized; or secondly, the light striking a reflecting surface may be partly absorbed or transmitted, and the part reflected may consist of elliptical movements of which the less axis has become 0, so that all have been brought into a single plane, when we have a single plane-polarized ray; or thirdly, the elliptical movements, though not rendered linear, may be brought to coincide in a given direction, giving partially polarized or elliptically polarized light; or fourthly, the resolution of the forces maintaining the vibration may be such that the axes of all the ellipses may be brought to coincide in direction, while the two axes in each become equal, when the light is circularly polarized. All the considerations from which these names are derived are thus extremely hypothetical; yet the conditions producing the various kinds of polarized light, and the results obtained with such light, are shown by mathematical analysis to correspond rigidly with these suppositions. Light may be very nearly or completely plane-polarized in 4 ways: 1, by double refraction; 2, by one reflection from a transparent body; 3, by several refractions through transparent surfaces; 4, by absorption or dispersion of part of the light. (1.) Light can emerge from a medium simply refracted or dispersed only when the medium is a gas or fluid, glass slowly and equally cooled, or a crystalline body of the monometric system, as the cube or the regular octahedron, &c., and this having the same temperature and density throughout its mass, and not exposed to pressure. But when a ray or beam of light passes through crystals of other forms, bone, horn, shell, hair, the crystalline lens of the eye, or elastic integument; or particular leaves, stalks, or seeds; or such artificial bodies as gums, resins, and jellies; or transparent bodies of varying density, owing to transient passage of heat, or to unequal temperature, or pressure; it will, in all these cases, save generally in some one direction of transmission, suffer a division into two rays. In the greater number of instances, both these will emerge, though in different places and directions; and the ray of light so affected is said to be doubly refracted. The substances effecting this change are said to be bi-refringent, or doubly refracting. This phenomenon, described by Bartholin in 1669, and first successfully studied by Huyghens in 1678, was first observed in crystallized carbonate of lime (Iceland spar). As the eye, receiving the divided ray, sees double images of objects observed through the crystal, the effect is conveniently witnessed by placing it over printed letters or other small objects, the crystal to be quite transparent, and better if an inch or more in thickness. The crystals showing no double refraction are such as have 3 equal, rectangular axes; and Sir D. Brewster believes that the absence of all apparent effect in these is owing to the fact of their having really 3 axes of no separation of the rays, the combined effect of which is to neutralize a tendency to separation in the directions intermediate. The ordinary crystal of Iceland spar is a rhombohedron, belonging to the hexagonal system, the crystals of which, as well as those of the dimetric system, have but one unequal axis of crystalline form. Now, singularly enough, if upon the crystal named we plane down and polish facets at right angles to this unequal axis, by taking off the two obtuse solid angles in which this axis terminates, we then find that any ray perpendicularly incident on either of these facets, so as to be transmitted in the course of the axis, or parallel with it, undergoes no separation, and, as we would expect, it is not refracted; while a ray falling obliquely on such facet, or falling in any manner on any other face of the crystal, is separated into two rays, generally both refracted, diverging more or less according to the direction and place of incidence, and emerging at different points. This result is termed double refraction of the light; the axis along which no separation occurs is called the optic axis. Any plane section containing this axis, called a principal section, gives a like result. In crystals of the kind now considered, one of the rays is refracted always according to the law of simple refraction (that of the sines), *i. e.*, it is in the plane of incidence, &c.; and if the light fall on an artificial face parallel with the optic axis, and so as to pass through the crystal in a plane at right angles to the axis (equatorial section), though there are two rays, they both obey the law of simple refraction. But in any other direction than one of the two now indicated, one of the rays is turned out of the plane of incidence, and at angles departing from those required by the law of the sines. This ray is therefore called the extraordinary ray; the other, the ordinary ray. In Iceland spar, tourmaline, &c., the former of these rays diverges more from the axis or perpendicular than the latter; its angle is greater, *i. e.*, its index of refraction is less, and crystals of this kind are termed negative. In quartz, ice, &c., the relation of the two rays is reversed, the path of the extraordinary ray being within, or nearer the perpendicular; and these crystals are termed positive. It will have been seen that in all cases an optic axis, also called an axis of double refraction, is not a fixed line through the crystal, but a fixed direction through it, and related to a line or lines about which the faces of the crystal are symmetrically placed. A large class of crystals, including the trimetric, have two chief axes of form, and accordingly two optic axes, or lines and directions in which a ray suffers no separation; while for all other incidences neither of the rays obeys the law of the sines; *i. e.*, both are extraordinary rays. These crystals are hence distinguished as bi-axal; those with one axis, as uni-axal. Among bi-axal crystals are mica, selenite, feldspar, &c. In rarer instances, 3 optic axes are found, or, as in analcime, there are several planes (not containing the same axes) of no refraction; in all such cases the results become extremely complex. Cubes of homogeneous glass become doubly refracting upon being unequally heated or pressed; and a laminated structure, traction, and electro-magnetism are prominent among the agencies inducing a like result. Now, if, by means presently to be indicated, we examine the two rays obtained in a case of double refraction, we find them both, and whatever the color of the light, completely polarized, and this always in planes at right angles to each other. A ray falling at any angle on glass has a portion reflected from the first surface, and, neglecting other particulars, a second portion transmitted through the glass. At any angle, both these portions are partially polarized; the most complete (maximum) polarization of the reflected ray occurs when the angle of incidence is 56° 45′; and at the same time the greatest polarization of the transmitted pencil possible by a gle plate takes place. Now, the first ray is id to be polarized in the plane of the incience, or in the plane of reflection, which is e same. That is, the plane of polarization e reflected light coincides with the plane of cidence; and with this corresponds the plane polarization of the ordinary ray in double fraction. But the transmitted ray on emerge is found polarized in a plane at right angles ith that of the incidence on the first surface, r with that of refraction (the two surfaces of e glass plate being supposed parallel); and e plane of polarization corresponds with that f the extraordinary ray. Unfortunately, however, the plane in which the vibrations of plane-olarized light are believed, from the latest esearches, to take place, varies in any case rom that now found by 90°; so that to the articulars already stated must be added this: he plane of vibration of plane-polarized light s always at right angles to that which is called he plane of its polarization. When the two rays emerging from a doubly refracting body are allowed to pass through a second, the principal sections of the two parallel, the rays are merely further separated; turned, so that the principal section of the one is perpendicular to that of the other, the ordinary becomes an extraordinary ray, and the reverse; in positions intermediate, both rays undergo separation anew, and 4 images are seen, save that in a single position all 4 images coalesce into one. Hence, a beam of light being passed, or bodies being seen through two such crystals, and one of them meanwhile turned, a succession of images appear, separating and reblending, during a half revolution, in the numbers and order, 2, 4, 2, 4, 1, &c. So, a ray polarized by reflection is perfectly reflected if impinging on a second mirror so that the perpendicular to the point is in the plane of polarization; but turn the mirror so that the perpendicular is at right angles to the plane of polarization, and the ray is totally extinguished; and in all circumstances where this occurs to polarized light striking a reflecting surface, perfect transmission occurs if a refracting medium be presented to it in the corresponding position, and vice versa. Hence, of any two polarizers, whether by double or ordinary refraction, or by reflection, either one may be used to impart polarity to a beam of common light; and the second then, properly placed to receive this beam, determines, by diminishing its brightness or extinguishing it in certain positions, that it had been polarized. Or, if certain light be known or suspected to be polarized, a crystal or mirror placed in its path, and turned, determines whether the light is polarized; and if so, shows by the positions in which the beam is made wholly or most nearly to disappear, in what plane polarization had occurred. Any contrivance capable of polarizing light is termed a polarizer; and any one capable of determining the condition of the light examined by it, an analyzer. Of course, any one of the former serves the latter purpose; though certain ones, as the mirror of blackened glass, a bundle of glass plates, or still better, a doubly refracting crystal properly prepared, are most convenient. The best of these is a tourmaline plate, or that known as Nicol's prism—simply an elongated prism of Iceland spar, cut into two by a section through an obtuse solid angle, and making an angle of 22° with the opposite obtuse solid edge, the terminal faces being ground to such an angle that, while they are parallel, one of them shall make an angle of 90° with the section. Then the two portions are reunited with Canada balsam, and the lateral faces blackened. In this prism the ordinary ray is totally reflected by the film of balsam, and absorbed by the blackened sides; the extraordinary ray passes through. A polarizer and an analyzer, with graduated arcs for reading degrees, and suitable connections, constitutes a polariscope; and by means of instruments of this kind most of the facts of polarization are ascertained, and application of its principles made. (2.) In respect to polarization by reflection, the general law arrived at by Brewster in 1814 is this: the angle, for any substance, at which maximum polarization occurs (called the polarizing angle), is that the tangent of which is equal to the index of refraction for that substance. This is true, whether the substance be transparent, or, for ordinary thicknesses, opaque; and the polarization decreases both ways from this angle of maximum. As a consequence, maximum polarization of reflected light always occurs when the sum of the angles of incidence and refraction equals 90°. Again, the different colors have different angles of maximum; so that polarization by reflection is never quite complete. The polarizing angle of glass for the mean ray is that above given; that of water, for the mean ray, 53° 11'. At other angles than the maximum, light is polarized to its maximum by repeated reflections. (3.) Transparent bodies transmit more light than they reflect; yet, in ordinary cases, for every angle the amount of polarization in the refracted equals that in the reflected beam. The effect is greatest at the polarizing angle; but even here the transmitted light is but partially polarized. By passing this light through a succession or bundle of plates, the polarization may be made complete. With 12 plates of crown glass, this occurs at 74°; with 24, at 60° 6', &c. (4.) Certain crystals, especially those of smoky or dark color, absorb a portion of the light, apparently one of the rays due to their double refraction, and transmit the other completely polarized. Of these, tourmaline is the best example. Light passed through one plate of this substance is almost completely extinguished by a second, only when the axes of the two are at right angles.—Beside the 4 methods now stated, there are some other actions capable of polarizing light, as that of the surfaces of some crystals. Elliptical polarization is especially found in the case of the metals; and it is feeble in degree. Ordinarily we see just as well by polarized as by common light; but there are circumstances in which a difference occurs. The crystalline lens of the eye being an analyzer, a person who has learned to detect them will discover in polarized light, from whatever source, an appearance of yellowish tufts or brushes crossed at the middle with violet (Haidinger's tufts, or *houppes*), which to other eyes are wholly undetected. Glare from water, glazed pictures, &c., consists largely of polarized light. Hence the water telescope containing a Nicol's prism, placed in a certain position, cuts off the polarized portion of the reflected light, and enables one to see the bottom of a shallow body of water, or fish beneath the surface; and an opera glass containing such prisms shows pictures in their true colors and without glistening, even when looked on obliquely. The same means has lately been proposed for enabling the eye to penetrate to greater distance into fog. If, between a polarizer and analyzer, a plate of selenite, mica, or almost any bi-refringent, of proper thinness, be introduced, one ray can be retarded, by difference of path, just so far as to interfere with the other on emerging, and the most beautiful colors are the result, which vary with the thickness of the film and the position of its axis. In this way, fine crystals of salicine, of bitartrate of potassa, and others, shavings of bone, &c., yield remarkable displays of changing color; and as these colors are strictly characteristic, or vary with the substances examined, a test of uncommon delicacy and accuracy is thus unexpectedly supplied, by which to determine, with the aid of the microscope, the nature of such substances as are capable of polarizing light, to detect adulterations in food, chemicals, &c. The change in the polarized ray in these cases has been named de-, or more properly di-polarization. These plates of many bi-refringent crystals exhibit each a characteristic set of colored rings, marked with a cross; the rings, as the plate is revolved, changing their colors to those complementary to them, and the crosses alternating from black to white. The differences in the dark cross of starch grains from various plants furnish a ready means of determining their source. A beam of common light is circularly polarized by rock crystal (quartz), and by many liquids, among which are most essential oils, and concentrated sirup of cane sugar. This condition is not readily detected by the ordinary analyzer, but by a peculiar polyhedron of glass, known as Fresnel's rhomb. In the bodies just named, it is replaced when the ray entering them is previously plane-polarized, by a rotation of the ray about its own axis, the amount of rotation being as the total thickness and the density of the medium. This phenomenon is called rotatory polarization; and it is detected by the ordinary forms of analyzer, as the Nicol's prism, the different colors being rotated in different degrees. Thus, in quartz, every $\frac{1}{25}$ inch in thickness shows the extreme red rotated 17° 30′, the middle green 27° 51′, the extreme violet 44° 5′. The rotatory power of a given depth and density of proper cane sirup being known, the rotation produced by any given sample becomes a measure of its density and purity, and hence of its value; and this is the principle of Soleil's saccharimeter. This rotation is from left to right; in different specimens of quartz it is right-handed or left-handed. Magnetic rotatory polarization is the same change, as induced or augmented by the action of an electro-magnet on a plane-polarized ray while being transmitted through certain media. Brewster and others have determined that the reflected light received at the earth's surface from the atmosphere is polarized, depending on the angular distance from the sun, save at certain changing neutral points. (See this subject in Johnston's "Physical Atlas.") Forbes, Melloni, and others have, by means of diathermanous media and the thermo-electric pile, shown the existence of both a polarization and di-polarization of heat; but no important results have yet been deduced. An application has been made of the principle of polarized light to the construction of a polarizing photometer, the object of which is to eliminate that part of the uncertainty in our judgment of the brilliancies of two lights viewed at the same time, which depends on differences of the colors of the lights; but the apparatus seems not to have come into use.—The discovery of polarization was first distinctly made by Malus so late as the year 1810. Its development since that time has been due to the labors of Young, Fresnel, Brewster, Biot, Arago, Sir John Herschel, and others.

POLE, Reginald, cardinal and archbishop of Canterbury, born at Stoverton castle, Staffordshire, in 1500, died in 1558. On his mother's side he was related to Henry VIII. Being destined for high positions in the church, he was sent when 7 years old to the Carthusian monastery of Shene, near Richmond in Surrey, and was graduated at Magdalen college, Oxford, in 1515. In 1517 he became prebendary of Salisbury, and in 1519 dean of Wimborne and Exeter. About 1520 he went to Padua to finish his studies. Returning to England in 1525, he was received with great favor by the king, and was much admired for his learning and abilities; but preferring to spend his time in study rather than in the gayeties of the court, he retired to Shene. He had been here about two years when Henry began to question the legality of his marriage with Catharine of Aragon; and Pole, foreseeing that there would be trouble, obtained from the king permission to visit Paris. Returning after a year's stay, his retirement was again disturbed by the determination of the king to throw off the pope's supremacy, and his desire to gain the approbation of his relative. As Pole refused his consent, to avoid the anger of Henry he passed over to the continent and dwelt successively at Avignon, Padua, and Venice. Meanwhile Henry had married Anne Boleyn, and wanted a defence of his title of head of the English church to be written by Dr. Sampson, bishop of Chichester. This was sent to Pole, who replied to it in a work entitled *Pro Unitate Ecclesiastica*, in which he compared the king to Nebuchadnezzar. Henry was so incensed with this treatise, that he withdrew from Pole his pension, deprived him of his preferments, and caused an act of attainder to be passed against him. Paul III., who was then pope, created him a cardinal, and sent him as nuncio to France and Flanders, and afterward as legate to Viterbo. Here he remained until the council of Trent, which he attended in the capacity of a papal legate, and is there said to have maintained the doctrine of justification by faith. Although suspected on this account of a leaning toward Protestantism, he was nevertheless employed by Paul in the affairs of the papal court, and upon the death of that pontiff came near being chosen his successor. Upon the accession of the new pope, he retired to the convent of Maguzano near Verona, and there remained until called to England by Queen Mary. He landed at Dover, Nov. 20, 1554, in the character of papal legate, and was received with great honor by the court. He was made archbishop of Canterbury after the burning of Cranmer, and was also elected chancellor of Oxford and subsequently of Cambridge. In the cruel measures which were taken at that time for the extirpation of Protestantism, it has been a matter of debate how far the primate was censurable; but the weight of evidence seems to favor the conclusion that he was inclined rather to lenient than to harsh proceedings. He died 16 hours after the death of the queen. His life was written by T. Phillips (2 vols., 1767).

POLECAT (*putorius communis*, Cuv.), a well known animal of the weasel family, spread over Europe and temperate Asia. It is about 16 inches long, the tail 6 inches additional, and 6 or 7 inches high; the general color is dark brown, fading into yellowish below, the legs and tail black, and the face whitish with a brown mask across the region of the eyes; the colors vary considerably. The form is elongated, the head short and rounded, the teeth the same as in the ferret, the feet 5-toed with sharp claws, the mammæ 4 and ventral, and the fur soft and thick. It is a very active animal, pursuing living prey upon the ground, and rarely ascending trees; very sanguinary by nature, its size limits its depredations to small animals, such as domestic fowls, ground birds, squirrels, rabbits, and other rodents; it is strictly nocturnal in its habits, remaining concealed during the day in some outbuilding on the farm, as it generally lives in the neighborhood of man, and committing its havoc at night in the hen roost and dove cot; it is destroyed by the farmer when possible, but it is so wary as generally to escape traps. When alarmed or irritated, it emits a very disagreeable odor in the secretion of the anal glands, which attaches itself even to the fur, preventing that use of it to which its fineness entitles it. The female generally makes her nest in a rabbit burrow, having previously killed or driven away the rabbit. Its habits and manner of killing its prey are the same as in the ferret. The common fur called fitch is that of the polecat, one of whose popular names is fitchet.

POLEMO. I. A Grecian philosopher, born in Athens about 340 B. C., died about 272. In his youth he gave himself up to sensuality; but chancing one day, when half intoxicated, to enter the academy while Xenocrates was discoursing upon temperance, he was so moved by the words of the teacher that he became one of his disciples, and went to the other extreme of rigid and austere temperance. He succeeded to the chair of Xenocrates, and was the teacher of Arcesilas, Crates, and Zeno. II. A Grecian geographer, whose birthplace is uncertain, flourished in the early part of the 2d century B. C. He wrote a "Voyage round the World," from Pontus to Carthage, and polemical works against Timæus and Eratosthenes. An edition of his fragments by Preller was published at Leipsic in 1838. III. A king of Pontus, died after A. D. 2. He was originally of Caria or Phrygia, and was the son of Zeno the rhetorician. He obtained his kingdom from Mark Antony, whom he served efficiently in the war against Parthia. He was made prisoner, but obtained his liberty at the time when the civil war broke out between Octavius and Antony, and immediately marched his army to the assistance of the latter. The battle of Actium ended the struggle, and Polemo was easily reconciled to Octavius, who admired his fidelity, confirmed him in his sovereignty, and added to his realm all the territory upon the Bosporus. In a war against the Aspurgians, a barbarian tribe, he was made prisoner and put to death. IV. Son of the preceding. His mother Pythodoris held the sovereignty after the death of Polemo I., her son assisting her in the administration; and upon her death (A. D. 39) he was recognized by Caligula. Three years later the emperor Claudius ceded Cilicia to him in exchange for the Cimmerian Bosporus, which was given to a descendant of Mithridates. Polemo II. embraced Judaism in order to espouse Berenice, famous for her amour with Titus; but that princess having left him, he returned to his former faith. He abdicated during the reign of Nero.

POLEVOY, NICOLAI ALEKSEEVITCH, a Russian author, born in Irkootsk, Siberia, June 22, 1796, died in St. Petersburg, Feb. 22, 1846. He was the son of a manufacturer and brandy distiller, was educated at home, and at a very early age wrote plays. "At last," says he in his autobiography, "I became my father's walking dictionary in geography and history, for my memory at that time was such as I have never met with in anybody else. To learn by heart a whole tragedy cost me nothing. In a word, if I must describe my mental progress up to the year 1811, it was this: I had read about a thousand volumes of all kinds and sorts, and remembered all that I read, from the verses of Karamsin and the articles in the 'European Messenger' to the chronological tables and the Bible, from which I could repeat whole chapters by heart. I was known in the town of Irkootsk as 'the wonderful boy,' with whom the governor himself used to converse, and the director of the grammar school to dispute as with a learned man." Having while still young removed to Moscow, he was forced to flee on the approach of the French army. Returning several years afterward, he established a newspaper called the "Moscow Telegraph," which inaugurated a new era in Russian literary criticism, but was finally suppressed on account of its liberal tendencies. In 1838 Polevoy went to St. Petersburg, where he spent the remainder of his life, writing essays, romances, translations, tragedies, comedies, and farces. His incessant labor gradually broke down his constitution, while the rapidity with which he produced his works had the same effect upon his fame. The best of his dramas are "Parasha, the Siberian Girl," the author's favorite; the "Grandfather of the Russian Fleet;" and a translation of Hamlet. He wrote the "Life of Suwaroff," one of the most popular books in Russia, the "Life of Peter the Great," and a "Life of the Emperor Napoleon," which extended no further than the burning of Moscow, but was completed by the author's brother. He also announced a "History of the Russian People," to be finished in 62 volumes, but of these 6 only appeared.—His brother, Xenophon Alexeievitch, after having been for many years a bookseller at Moscow, is now living at St. Petersburg. He has written several works of considerable literary value, one of which is the novel of "Michael Vasilevitch Lomonosoff" (2 vols., Moscow, 1836).

POLI, Giuseppe Xaverio, an Italian naturalist, born in Molfetta, in the kingdom of Naples, in 1746, died in 1825. He entered the army, and was appointed by Ferdinand I. in 1776 professor of military geography at Naples, was soon after commissioned to visit the principal military schools of Europe, became a fellow of the royal society of England, and after his return was made professor of experimental philosophy and director of the military academy at Naples. Poli was distinguished as a comparative anatomist and physiologist, but particularly for his knowledge of the character and habits of testacean mollusks, in which department he made a large collection, and published the results of his investigations in a finely illustrated work entitled *Testacea Utriusque Siciliæ* (2 vols. fol., Parma, 1792–'5; vol. iii., 1826). His descriptions are mostly very accurate, and he discovered many new genera and species. To him is due the discovery of the nervous system of the testacea.

POLICE (Gr. πολιτεια, government), a judicial and executive system and an organized civil force for the preservation of order and the enforcement of the laws. There are traces of a police, or something analogous to it, in Athens, Corinth, and Ephesus. In Rome the duties of the policeman seem to have been shared by several classes of officials; the lictor arrested criminals and conducted them into court, and the inspectors, subprefects, and other officers, either personally or by their subordinates, performed most of the civil duties now devolving on the police. In despotic governments the police have exercised important and often oppressive functions. Its beneficent action in sanitary matters, in preventing and detecting frauds, larcenies, and petty crimes, and in promoting the reformation of juvenile offenders, is of recent date even in those countries where the system has been longest and most completely organized.—The police system in France, though not so oppressive, except for some comparatively brief periods, as in some of the other countries of Europe, is of considerable antiquity. Previous to the middle of the 15th century, the provost of Paris and his lieutenants, civil and criminal, were charged with maintaining the peace of the city, and with the suppression of vagrancy. About 1446 or 1447 the city was divided into 16 districts, over each of which a commissary of police presided, having under him a certain number of sergeants, the whole being under the control of the provost, to whom in 1448 Charles VII. committed a general jurisdiction over the vagrants and malefactors of the kingdom. About 1520 Francis I. deprived the provost of the city of his extensive jurisdiction, and created a provost marshal (*prévôt de maréchaux*) for the city and district of Paris, who was authorized to apprehend and punish vagrants and disorderly persons, without appeal. Under his orders were placed 30 constables, and the number of commissaries and sergeants of police was doubled. But even with this increase of force there were as late as 1560 only 500 men of all ranks in the Parisian police. The superintendence of the markets, weights and measures, and cesspools, the cleansing of the streets, the inspection of buildings, and the prohibition of noxious trades, were all subjects of legislation in France at a very early period, statutes having been passed relative to them at various dates between 1350 and 1560. The importance of having them all included in one system of surveillance was not, however, understood, and each had its own inspectors, amenable to no common head. In 1577 the privilege of electing their own police magistrates was granted to the inhabitants of each of the districts of the city. Under Louis XIV. the police attained its highest measure of perfection as a repressive force. A universal espionage was established, and the slightest intimation of restiveness under the yoke of oppression, or the smallest departure from the monarch's views of orthodoxy, was visited with summary arrest and punishment. In its more humane and protective functions it was less successful. Under the reign of Louis XV. it partook of the general decay and demoralization which had infected the other departments of government, was the base pander to the depraved appetites of the monarch, and furnished the ready means of extortion and oppression of those who had become obnoxious to his favorites. The national convention in 1794 reorganized the police and defined its duties. These duties comprised almost every department of administrative government, including, among other matters, the securing of the safety of traffic; the repair of dangerous structures; the superintendence of the cleansing and lighting of the city; the removal of public nuisances; the repression and punishment of all offences against the public peace; the maintenance of good order in and supervision of all public gatherings, festivities, and places of public amusement and resort; the inspection of weights, measures, and food; precautions against accidents, casualties, and epidemics, and measures in mitigation of them if they occurred; the delivery of passports, residence licenses, &c., and the repression of beggary and vagrancy; the supervision of drinking and gaming houses, and of prostitutes; the dispersion of crowds; the police of religious worship and of printing and bookselling; the oversight of theatres, powder mills, saltpetre works, and storehouses of arms; the pursuit of deserters and escaped criminals; the care of the highways, of the public health, and of fires, inundations, and accidents; the superintendence of the exchanges of commerce, of the taxes, of the provision markets, and of prohibited wares; and the protection of public monuments. To these multifarious duties were added, soon after, the regulation of the fees of health officers and veterinary surgeons, the removal of sick persons and corpses, the recovery of drowned persons, and the care of the public pounds. During the administration of Napoleon I. the city police of Paris attained a high degree of efficiency. The ablest of the prefects of police of that period, Gisquet, has written the memoirs of his times. Under Louis Philippe, the number of the regular policemen, *sergents de ville*, had risen in 1847 to 1,800. It was during his administration that the present system of police respecting prostitution, which had been for many years under police surveillance, was adopted. The Parisian police is now metropolitan, comprising the whole department of the Seine, the districts of St. Cloud, Sèvres, and Meudon in Seine-et-Oise, and the market of Poissy. It is in charge of a prefect, who is under the authority of the minister of the interior. He is president of a council of health of 20 members, all physicians, surgeons, or chemists, which has charge of all sanitary matters, and meets fortnightly. Beside this council, there are 11 bureaus, in 3 divisions, each under a competent head, and each in charge of a class of police regulations. There is also a commissary of police in each of the 80 quarters of Paris.—Beside the local police of Paris, which under some of the Bourbon kings assumed or was endowed with national jurisdiction, there has been for two centuries a system of national police in France, whose functions have been mainly detective and repressive. The espionage of suspected strangers visiting the country, or of persons believed to be disaffected or to entertain designs against the government, the correspondence of those regarded as hostile to the reigning authority, and other similar subjects, have been the duties intrusted to it. Until 1796 this national police had been under the direction of the ministry of the home department; but at that time the directory created a ministry of police, and after Cochon, Lenoir de la Roche, and Sotin had each held the post of minister for a brief period, Fouché received the appointment in 1799, and held it with brief intermissions till Sept. 1815. Decazes, the successor of Fouché, retained the office till 1818, when it was abolished as an independent department.—In England, from the time of the Saxon kings, there had existed an organization of a partially voluntary character for the repression of crime, the arrest of criminals, and the maintenance of good order. The population was divided into hundreds, and these into tithings or companies of 10 freeholders with their families. The principal man of the hundred was the justice of the peace, or local magistrate, for the trial of small causes, and the head man of the tithing was responsible for good order and the arrest of criminals in his limited district. As the population increased, however, and criminals grew more daring and ferocious, it was found that these voluntary officers did not like to arrest or convict a known and desperate offender, lest, as was often the case, he should subsequently wreak his vengeance on them. The high sheriff of the county, his deputies, and the constables appointed by the parishes, were eventually substituted for the voluntary officers of the earlier period; but while they answered their purpose tolerably well in the rural districts, they were neither numerous nor efficient enough to repress crime in London. As late as 1751, Henry Fielding, the novelist, then magistrate at Bow street, the only court for police offences at that time outside the city proper, in an "Inquiry into the Causes of the recent Increase of Robberies," stated as matter of public notoriety that the streets of London were not safe for citizens after nightfall, and that highway robberies, murders, and other flagrant crimes were of common occurrence, and their perpetrators were seldom or never detected or arrested. He suggested a paid police, under the orders of the acting magistrate at Bow street. In 1753 such a force, of very moderate extent, was established in accordance with an act passed that year; but such was the fear of the people lest this measure should lead to encroachment upon their liberties, that a violent opposition was raised to it, and it was soon repealed. In 1792 an act was passed for the increase of the police courts, the employment of salaried magistrates, and the enlargement of their jurisdiction. Under this act, 8 police offices or courts were established, and the magistrates received a salary of £400 each, which was afterward raised to £600. In 1800 there were 6 police constables attached to each of the metropolitan police offices, or 48 in all; 60 other constables, under the charge of the chief magistrate at Bow street, patrolled the metropolitan roads; the Thames police establishment, organized in 1798, consisted of 41 officers; the city of London employed and paid 40 more; and beside these there were 868 parish officers serving without pay. The night watch and patrol consisted of 2,044 men for the entire metropolitan district, of whom 808 were in the city of London. The greater part of these men were aged, feeble, infirm, and many of them half starved; their compensation ranged from 17 to 36 cents per night; and they were under the control of more than 70 different boards of officers. This state of things continued, with little amelioration, till 1829, when Sir Robert Peel's "act for improving the police in and near the metropolis" was passed. This act established an effective constabulary force under two commissioners, but left several petty detached bodies of peace officers within the district. In 1839 it was modified by an act consolidating the entire constabulary force of the metropolis, the city of London excepted, which still maintains a small independent force, 608 men in 1859. By this act also the entire executive duties of police were intrusted to the commissioners; their sphere of action in regard to all matters properly belonging to police was greatly enlarged; the police courts were assimilated to the other courts of justice, and a single magistrate was empowered to decide, without appeal, questions involving sums of money not exceeding 40 shillings, as well as those cases of offence against the person so constantly recurring in a police court; and the boundaries of the police districts were changed to adapt them the better to the growth of the metropolis. In 1856 the joint commissioners were superseded by one commissioner, whose salary was fixed at £1,500, and two assistant commissioners were appointed, at a salary of £800 each.—The rural police or county constabulary force in England is of recent origin. The difficulty of arresting criminals and preventing crime, especially among juvenile offenders, led to its organization. In 1840 parliament passed an act permitting any county, or part of a county, to organize a police force on a plan somewhat similar to that of the metropolitan police. The county of Essex availed itself of the permission the same year; and between 1840 and 1858, 18 English and 4 Welsh counties had adopted it for the whole of each county, and 7 others for parts. In 1856 the "act to render more effectual the police in counties and boroughs" was passed, and there is now a county constabulary force in every county, which reports annually to the secretary of state. The effect of the organization of this force has been greatly to diminish the amount of crime, especially among the young, who are now promptly committed to reformatories, and to render property safer and the administration of justice more uniform. The expenditure for the county constabulary in 1859 was £991,555, and the total number of policemen was 13,309.—In Scotland the organization of an efficient police in the large towns dates from 1834, and has been materially modified by subsequent laws. The rural police has been organized under the law of 1857, which is similar in its provisions to the English law of 1856.—In Ireland, until 1814, the police was in a perfectly chaotic state. The law passed that year led to improvements in detail, but did not remove the management of the force nor the functions of the inferior magistracy from partisan control, by which they were often made the instruments of outrageous abuses. The act of 1836, and its subsequent modifications in 1848 and 1857, have greatly improved it. It is of a quasi military character, being well armed and occupying barracks. In 1858 the number of members was 12,067, and the cost £668,700. The city of Dublin and its vicinity has also a metropolitan police, with a force of 1,087 men; its cost in 1858 was £77,027.—In the United States, the provisions for the repression of crime and the detection and arrest of criminals were copied from those of Great Britain. Each county had its sheriff and deputies, and, where there were town organizations, each town its constables. Justices of the peace, of whom there was a considerable number in each county, and often in each town, appointed by the legislature, or of late elected by the people of the town or county, had absolute jurisdiction in petty civil and criminal cases, and power to bind the accused over to a higher court in any case. In the larger towns, the danger to property from fires, burglaries, &c., in the night time, led to the appointment of watchmen, who, like those of London, were often aged and infirm men, few, and poorly paid. The organization of a day police is of recent date even in the cities of New York, Philadelphia, Baltimore, Boston, New Orleans, and Cincinnati. At first the police force was municipal, confined to the chartered limits of the city, and appointed by the mayor and council. To such a plan there were found to be two serious objections, viz.: that evil doers would escape beyond the city limits, and thus evade their jurisdiction, and that the appointment and control of the police was made a partisan matter. In 1857 the legislature of New York passed an act for the establishment of a metropolitan police force, which should possess constabulary powers in the counties of New York, Kings, Westchester, and Richmond, and in the towns of Jamaica, Newtown, and Flushing, in the county of Queens. This force was to be under the control of 7 commissioners, including the mayors of New York and Brooklyn *ex officiis*. In 1860 this act was modified and the number of commissioners reduced to 3, who were to be appointed by the governor, and to serve 5 years. The duties of the policemen were also enlarged by this act, and now include most though not all of those of the police force of London and Paris. The following tables give the comparative statistics of the police of London and New York, with the force and cost of that of Paris:

TABLE I.—NUMBER, GRADE, AND PAY OF POLICE FORCE, AND TOTAL EXPENDITURE.

Metropolitan district.	Commissioners.	Pay.	Superintendents.	Pay.	Inspectors.	Pay.	Captains.	Pay.	Sergeants.*	Pay.	Patrolmen.*	Pay.	Total force.	Total pay of force.	Total expenditure for police service.
London, 1860....	1 at 2 at	$7,260 8,872	22	$2,130 to 963	189	$968 to 897	..	..	10 at 691 at	$529 208	5,708	$378 to 289	6,638	$1,705,696	$2,878,508
Paris, 1859 †	8 at	2,000 1,600 1,000	25	800	85	1,000 to 600	57	$860	319	320	3,950	300	4,298	1,600,000	1,669,280
New York, 1860.	3 at	8,000	1	5,000	1 at 3 at	2,400 2,000	32	1,200	146	900	1,600	800	1,786	1,276,577	1,832,977

TABLE II.—RESULTS: LONDON, 1856; NEW YORK, 1860.

Metropolitan district.	Population.	Whole number of arrests.	Males.	Females.	Under 15.	Under 20.	Offences against the person.	Offences ag'st property.	Vagrants.	Sanitary cases.	Natives.	Foreigners.	Percentage of offences ag'st the person to all offences.	Percentage of offences ag'st property.	Percentage of vagrants.
London.......	2,500,000	73,240	..	..	..	..	10,480	24,749	2,592	1,945	..	..	14.8	83.8	8.5
New York....	1,400,000	81,143	56,975	24,168	2,886	10,585	61,900	18,975	5,268	12,093	17,811	63,832	76.2	17.9	6.49

Though strongly opposed at first, the change of system in New York has proved beneficial, and is generally approved. Baltimore and Philadelphia have adopted a similar one, and the change is about to be made in Boston. The police courts in New York (and the same is true, we believe, in the other cities which have adopted the system) are not a part of the metropolitan police organization. The pay of both officers and men is higher than that of the London or Paris metropolitan police, that of the men being more than double; so that in London, with a force nearly 4 times as large (the proportion being 1 to 324 of the population, against 1 to 784), the cost of the police is less than twice as much as in New York; while with Paris (pop. 1,324,346; proportion, 1 to 803) the comparison is nearly the same.

POLIGNAC, JULES AUGUSTE ARMAND MARIE, prince de, a French statesman, born in Paris, May 14, 1780, died at St. Germain-en-Laye, March 29, 1847. His parents being obliged to leave France at the time of the revolution, he went first to Russia, and then to England as aid of the count d'Artois (afterward Charles X.), and in Dec. 1803 returned to France, being concerned in the conspiracy of Cadoudal and Pichegru. When the plot was discovered, his brother Armand, who was also engaged in it, was sentenced to death, and he himself to 2 years' imprisonment. Armand's life was spared, but both were retained in captivity until 1814, when they escaped and rejoined the count d'Artois. After the second restoration, Jules was made a peer of France, but refused to take the constitutional oath on account of religious scruples, until these were relieved by the pope, who also made him a Roman prince. In 1816 he married Miss Campbell, a Scottish heiress. He was minister to London from 1823 to 1829, when he was recalled by Charles X., and in August became the head of the new ministry, with the portfolio of minister of foreign affairs. He was the representative of the ultramontane party in the state, and was looked upon with great disfavor by the friends of constitutional liberty throughout France. The growing difference between the ministry and the chambers, and the arbitrary measures of the court, after a few months led to the revolution by which Charles was deprived of his throne. Polignac fled, but was arrested at Granville, Aug. 15, 1830, in the disguise of a valet, was tried, found guilty, sentenced to imprisonment for life, and confined in the fortress of Ham until 1836, when he was released, lived for some time in England, and finally returned to France. During his imprisonment he wrote a work entitled *Considérations politiques* (Paris, 1832).

POLIGNAC, MELCHIOR DE, a French cardinal and statesman, great uncle of the preceding, born in Puy, Oct. 11, 1661, died Nov. 20, 1741. He was sent as ambassador to Poland by Louis XIV., and after the death of John Sobieski in 1696 contrived to have the prince of Conti elected king; but this choice not being accepted by the nation, who placed the crown on the head of Frederic Augustus, elector of Saxony, Polignac fell into disgrace and was recalled. Banished to his abbacy of Bonport, he employed his time in refuting Lucretius in a Latin poem entitled *Anti-Lucretius, sive de Deo et Natura* (2 vols. 8vo., 1745). He returned to court in 1702, was made auditor of the rota at Rome in 1706, and minister plenipotentiary to Holland in 1710, and was a commissioner on the part of France to negotiate the treaty of Utrecht in 1713. On his return from the last embassy he was created cardinal. During the regency he attached himself to the party of the legitimists, and was again banished until 1721. From 1724 to 1732 he was the French minister at Rome, and in 1726 obtained the archbishopric of Auch. He succeeded Bossuet in the French academy in 1704.

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* These officers in London also receive their clothing, and a ton of coal yearly if married, or ½ of a ton if single.

† The titles of the officials are of course different in Paris, but we have arranged them as far as possible under corresponding grades.

POLITIANUS, ANGELUS. See POLIZIANO.

POLITICAL ECONOMY (Gr. οικος, a house, and νομος, a law), properly, an exposition of the measures necessary for directing the movements of society so that man may act in harmony with those laws which control him in his efforts to improve his condition. Great confusion exists not only in the definition of political economy, but in the various expressions made use of in treating of the subject, and even in settling upon some general understanding of its scope. By some writers it has been treated as a science, by others as an art, and Sir James Steuart speaks of it as a combination of the two. Mr. Senior considers it "the science which treats of the nature, the production, and the distribution of wealth." Archbishop Whately would give it the name of "catallactics, or the science of exchanges." Mr. McCulloch considers it "the science of the laws which regulate the production of those material products which have exchangeable value, and which are either necessary, useful, or agreeable to man." M. Storch says it "is the science of the natural laws which determine the prosperity of nations, that is to say, their wealth and civilization." M. Sismondi considers "the physical welfare of man, so far as it can be the work of government, as the object of political economy." M. Say defines it as "the economy of society; a science combining the results of our observations on the nature and functions of the different parts of the social body." The progress thus far made in political economy has been slow and uncertain, and there is in its entire range hardly a doctrine or even the definition of an important word which is universally or even generally accepted beyond dispute. In 1844 Mr. De Quincey was forced to acknowledge that it did not advance, and that from the year 1817 it had "on the whole been stationary;" and he further adds: "Nothing can be postulated, nothing demonstrated, for anarchy even as to the earliest principles is predominant." M. Rossi says: "Notwithstanding the pretensions so frequently put forward by politicians and economists, some of the most interesting portions of the sciences they profess are still imperfectly understood;" while "the important art of applying them to the affairs of mankind, so as to produce the greatest amount of permanent good, has made but little progress and is hardly indeed in its infancy." Amid all their discords and disagreements, it is possible to divide political economists under two general heads: those who treat the subject as a deductive science, "in which all the general propositions are in the strictest sense of the word hypothetical;" and those who treat it by the inductive or Baconian method. Of the first named school are all the English economists and most of those of continental Europe who have acquired any reputation. As the representatives of the last, Mr. Henry C. Carey and his followers are most prominent. —The earliest treatise on an economic subject is believed to be "The Eryxias, or About Wealth," erroneously attributed to Æschines Socraticus, one of the disciples of Socrates, and assigned to the date of 427 B. C. "Plato," says Say, "has with tolerable fidelity ('Republic,' book ii.) sketched the effects of the separation of social employments, but solely with a view to point out man's social character, and the necessity he was in, from his multifarious wants, of uniting in extensive societies, in which each individual might be exclusively occupied with one species of production. It is an entirely political view, from which no other consequence can be drawn." To Aristotle, however, is due the honor of being the founder of political economy. His three treatises—"Ethics," which treats of the regulation of the individual man; "Politics," of the relation of man toward others in a social capacity, both private and public, the family and the state; and "Economics," of the relation of man toward property—constitute in a measure a connected work, each being dependent on and interwoven with the others. The expression political economy was first used by Aristotle, and is to be found in the "Economics," book ii. chap. i. He lays down the dogma that the bounty of nature is the only true source of wealth, and he holds in great abhorrence trading and usury, which latter, he says, "is most reasonably detested, as the increase of our fortune arises from the money itself, and not by employing it to the purposes for which it was intended." But little attention was paid to economic studies for many centuries after the time of Aristotle. The ancients regarded industrial occupation of any kind as degrading and unworthy of freemen. Agriculture was looked upon with much more favor than any other employment involving labor, but even farm labor was performed almost entirely by slaves belonging to and employed by the landlords. The light in which trade was regarded by the Romans may be gathered from Cicero, who in his "Offices" says: "The gains of merchants, as well as of all who live by labor and not skill, are mean and illiberal. The very merchandise is a badge of their slavery."—During the middle ages, and for some centuries thereafter, no advance was made either in commercial adventure or in letters; but "the fortunate enterprises of the Portuguese and Spaniards during the 15th century, the active industry of Venice, Genoa, Florence, Pisa, the provinces of Flanders, and the free cities of Germany, about the same period, gradually directed the attention of some philosophers to the theory of wealth." These investigations originated in Italy. "As far back as the 16th century," adds Say, "Botero had been engaged in investigating the *real* sources of public prosperity." The earliest general treatise on this subject in modern times, and the first bearing the title of political economy, is the *Traité de l'économie politique*, by Antoine de Montchrétien (4to., Rouen, 1615). This work treats of the utility of mechanic arts and the regulation of manufactures, employment of men, the trades most important to communities, commerce, transportation, money, &c. In 1613 Antonio Serra published in Naples a volume on the causes which tend to aid an accumulation of the precious metals in those countries which do not produce them; and in 1618 Gian Donato Turbolo published in the same city a treatise on the money of the country. About this time treatises on commerce and the prohibitive system were published by Duarte Gomez (Lisbon, 1622) and Juan de Castañares (1626).—The attention of the earliest English writers on political economy was directed to foreign trade. They saw that it was desirable to have a metallic currency suited to the wants of the business of their country, and while advocating the extension of foreign commerce, they recommended the adoption of such measures as would cause gold and silver to flow into the country, and not out. The policy advocated by this school is known to economists as the mercantile system. It was supported among others by Misselden ("Circle of Commerce," 1623), and by Mun ("England's Treasure by Forraign Trade, or the Balance of our Forraign Trade is the Rule of our Treasure"). The last named treatise, though not published until 1664, after the author's death, was probably written as early as 1635-'40. In 1668 appeared the first edition of "A New Discourse of Trade," by Sir Josiah Child. Its author is usually classed among the mercantile school, but he did not regard a direct examination of the comparative amount of imports and exports, or even the movements of the precious metals, as a proper test of the advantages or disadvantages of a foreign trade; but he rather looked to its increase or decrease as presenting the most tangible evidence. He advocated reducing the rate of interest from 6 to 4 per cent., believing it to be the *causa causans*, as he expressed it, and that it would greatly facilitate business. He recommended "the prevention of the exportation of our wool, and encouraging our woollen manufactures," and that in Ireland the "linen rather than the woollen manufacture be set up." Further, that the trade of those countries "that vend most of our manufactures, or supply us with materials to be further manufactured in England," be most encouraged. In 1677 Andrew Yarranton published "England's Improvement by Sea and Land; to outdo the Dutch without Fighting, to pay Debts without Moneys, to set at Work the Poor of England with the Growth of our own Lands," &c. The means by which he designed to advance the prosperity and power of England were the introduction of a general system of banking, thus furnishing "the great sinews of trade, the credit thereof making paper go in trade equal with ready money," a registry of real estate to facilitate its transfer and mortgage, the improvement and development of the production and trade in linen, woollen goods, and iron, the introduction of canals and the improvement of rivers and harbors, with a view to facilitating internal trade and intercourse. He held that a country desiring to be rich, powerful, and happy, must introduce a diversified industry; and he recognized the necessary means for bringing about its development. "Above all," says Patrick Edward Dove, who regards him as the founder of English political economy, "we must note his prospective sagacity, for he points out in detail the very course that England has pursued, and the very elements that were to contribute to her commercial superiority."—A most important era in the history of political economy, as well as of industrial development, was the year 1662, when Louis XIV. placed Colbert in the position of comptroller-general of the finances of France. Of him it has been remarked by a distinguished French economist: "He is the only minister of state who has constructed a system complete and connected in all its parts, and to the immortal honor of his name be it said, he carried it out in despite of every obstacle which was thrown in his way." He reduced the national finances to system and order, and instituted a complete plan of checks and balances; reformed abuses in this department, and punished those who had been guilty of them; increased the revenues of the state, while at the same time he decreased the burdens of the people; provided for economical expenditures, and abolished many of the internal taxes; developed agriculture, manufactures, the arts, and the sciences; improved roads and rivers, built canals, and by every means fostered and increased the internal commerce of the country. By some writers the protective features of his tariff laws of 1664 and 1667 have been condemned; but on the other hand we are assured that for several years before his administration "France swarmed with vagabonds and mendicants," and had reached "the most profound depth of commercial depression," and that under the laws of which he was the author she rose to "a point of wealth and industry far beyond any she had ever reached since the foundation of the monarchy;" and even M. Say says: "It is not true that Colbert ruined France," but that, "on the contrary, France under Colbert's administration emerged from the distress in which two regencies and a weak reign had involved her."—The various restrictions upon trade, especially upon the importation of manufactured goods, and the export of the raw materials used in manufactures, at this time, and even later, and especially in England, were of a very onerous character. The penalties for the infringement of the laws were in many cases cruel and even barbarous. This system, with the policy pursued under it, was attacked by various writers. Among the earliest and ablest of these may be mentioned Sir Dudley North, who published "Discourses on Trade" (4to., London, 1691). Among the doctrines held by him as fundamental were: "That the whole world as to trade is but as one nation; that money is a merchandise whereof there may be a glut as well as scarcity, and that even to an inconvenience; that a people cannot want money to serve the ordinary dealing, and more than enough they will not have; and that money exported in trade is an increase to the wealth of a nation." Sir William Petty, in "Quantulumcunque, or a Tract concerning Money," had in 1682 attacked the theory of "the balance of trade;" and there were at a subsequent day many champions on both sides of this vexed question; among others Dr. Davenant (1695–1712), who espoused the so called mercantile theory, and Sir Matthew Decker (1743–'4) and Joseph Harris (1757–'8), who opposed it. In 1698 appeared in London "Historical and Political Essays, or Discourses on several Subjects," including money, government, &c., by John Locke, in which he for the first time promulgated some of the favorite theories in regard to money now held by European economists.—In 1758 there appeared at Versailles the *Tableau économique, et maximes générales du gouvernement économique*, by François Quesnay, followed by *Théorie de l'impôt*, by the elder Mirabeau (1760), *La philosophie rurale*, also by Mirabeau (1763), and various other works by Quesnay and his disciples, expounding the physiocratic or agricultural system of economy. The physiocratists held that the earth was the sole producer of wealth, and divided the industrial members of society into 3 classes: 1, the proprietors of the land; 2, the cultivators, consisting of farmers and agricultural laborers, whom they regarded as a productive class; 3, the mechanics, manufacturers, and merchants, whom they styled the unproductive class. That portion of his income which the landlord laid out in the improvement of his land they characterized as productive expenses; and in so far as the landlord by these expenditures aided the farmer in increasing the amount of his produce, the landlord became one of the productive class. They maintained that the labor of mechanics, manufacturers, and artisans was unproductive, because it merely replaced the stock which employed them, together with the ordinary profits of that stock; and that mercantile stock was unproductive because it merely continued the existence of its own value. They admitted that mechanics, manufacturers, and merchants might augment the revenue and wealth of society, but that it could only be accomplished by parsimony or privation. They believed that the most perfect freedom of trade with all nations was the great desideratum in agriculture. Dissenting entirely from the central idea of this school and its logical deductions, Adam Smith, however, in 1776, expressed the opinion that "with all its imperfections it is, perhaps, the nearest approximation to the truth that has yet been published upon the subject of political economy." Among the most eminent of the physiocratists was Turgot, afterward comptroller-general of finances, who early embraced the views of Quesnay, and in 1771 published *Réflexions sur la formation et la distribution des richesses*, the ablest of the treatises of this school. "In 1764," says Say, "Genovesi commenced a public course of lectures on political economy from the chair founded by the care of the highly esteemed and learned Intieri. In consequence of his example, other professorships were afterward established at Milan, and more recently in most of the universities in Germany and Russia."—Among the contributions to political economy up to the end of the 18th century, none evince greater reasoning power than the "Political Essays" of David Hume, which appeared in 1752. Among those essays which may be mentioned as coming within the limit of political economy, are "Commerce," "Refinements in the Arts," "Money," "Interest," "The Balance of Trade," "The Jealousy of Trade," "Taxes," and "Public Credit." According to these essays, every thing in the world is purchased by labor, and our passions are the only causes of labor; when a nation abounds in manufactures and the mechanic arts, scientific agriculture becomes possible, and the cultivators of the soil redouble their industry and attention, the surplus produce being readily exchanged for the products of those manufactures and mechanic arts, and the land furnishes more than is needed for the support of those who cultivate it; while on the other hand, where this diversified industry does not flourish, there is no inducement for the agriculturists to increase their skill and industry because of the difficulty of exchanging any surplus. Foreign trade by its imports furnishes raw materials for new manufactures, and by its exports gives employment to labor, which in the absence of this trade might be wasted. Necessity is the great incentive to industry and invention—rather the fears than the hopes, the aspirations, and the ambition of mankind. When industry and the arts flourish, the mind acquires new vigor, enlarges its powers and faculties, and at once satisfies its natural appetites and prevents the growth of unnatural ones. The same age which produces great philosophers and politicians, renowned generals and poets, usually abounds in skilled weavers, ship carpenters, and other operatives and mechanics; and "thus industry, knowledge, and humanity are linked together by an indissoluble chain." Progress in the arts is favorable to liberty, and has a natural tendency to preserve a free government by its effects upon the people. Money Hume considers not properly one of the subjects of commerce, but "only the instrument which men have agreed upon to facilitate the exchange of one commodity for another." He holds to the idea that "an increase in the amount of money in a country is rather inconvenient than advantageous, the influence which it exerts being to heighten the price of commodities, and oblige every one to pay a greater number of these little yellow or white pieces for every thing he purchases." Thus did he reason in regard to money, but he could not fail to observe in actual experience an apparent departure from the course here laid down. He had been led to notice that "in every kingdom into which money begins to flow in greater abundance than formerly, every thing takes a new face; labor and industry gain life; the merchant becomes more diligent and skilful, and even the farmer follows his plough with greater alacrity and attention." In order to explain away the discrepancy between these practical results and his theory, he enters into a series of reasonings to show that it is not immediately upon the receipt of this money into a country that a rise in prices takes place, but that "some time is required before the money circulates through the whole state, and makes its effects felt on all ranks of the people." The rate of interest, he holds, "is not derived from the quantity of the precious metals," but "high interest arises from three circumstances: a great demand for borrowing, little riches to supply that demand, and great profits arising from commerce." "I should as soon dread," he adds, "that all the springs and rivers should be exhausted, as that money should abandon a kingdom where there are people and industry. Let us carefully preserve these latter advantages, and we need never be apprehensive of losing the *former*." While deprecating as unwise and illiberal all "those numberless bars, obstructions and imposts," which nations have laid with the object of retaining the precious metals, he says that "all taxes upon foreign commodities are not to be regarded as prejudicial or useless, but those only which are founded upon the jealousy" of the balance of trade. "A tax on German linen encourages home manufactures, and thereby multiplies our people and industry. A tax on brandy increases the sale of rum and supports our southern colonies."—In 1767 there appeared in London "An Inquiry into the Principles of Political Economy, being an Essay on the Science of Domestic Policy in Free Nations," by Sir James Steuart, a countryman of Hume. This was the largest and most elaborate book on the subject which had yet appeared. The various subjects of which it treats in detail are population, agriculture, trade, industry, money, coin, interest, circulation, banks, exchange, public credit, and taxes. Economy in general Steuart defines as the art of providing for all the wants of a family with prudence and frugality. Political economy he regards as an art, and also a science; and among its important objects are "to provide every thing necessary for supplying the wants of society, and to employ the inhabitants in such a manner as naturally to create reciprocal relations and dependencies, so as to make their several interests lead them to supply one another with their reciprocal wants." Population he considers limited by the amount of food produced, and "that when too many of a society propagate a part must starve." He holds that if a nation would aim to be continuously great and powerful by trade, she must first apply closely to the manufacturing of every natural product of the country; and that when a people find the balance of trade to be against them, it is to their interest to take such measures as will correct the evil. He attacks the theory of Locke and Hume respecting the effect of an increased volume in the circulating medium upon prices. He argues that, while the wealth of a country undoubtedly exerts an influence upon the prices of certain commodities, prices are really regulated by "the complicated operation of demand and competition;" and that when Hume says that "the price of every commodity is in proportion to the sum of money circulating in the market for that commodity," it really means that the money to be employed in the purchase of it is a measure of the demand for it; and it in no wise interferes with Steuart's own proposition respecting the operation of supply, which is fundamental.—In 1776 appeared in London the first edition of the great work of Adam Smith, destined to exert so decided an influence on political economy and legislation: "An Inquiry into the Nature and Causes of the Wealth of Nations." This remarkable book treats "of the causes of improvement in the productive powers of labor, and the order according to which its produce is naturally distributed among the different ranks of the people; of the nature, accumulation, and employment of stock; of systems of political economy; of the revenue of the sovereign or commonwealth." Possessed of singular and great merit, it is also distinguished by the absence of clear definitions of terms; by a want of unity, great central principles being merely enunciated but not elaborated, and their importance and their bearing upon other portions of the science not being shown; the illogical and rambling manner in which different subjects are treated; the general absence of method; and the inconsistency and want of harmony among the several parts. "It is only," says Say, "a promiscuous assemblage of the soundest principles of political economy, supported by the clearest illustrations, and ingenious statistical speculations, blended with instructive reflections; it is not a complete treatise on either science, but an ill-digested mass of enlightened views and accurate information." Dr. Smith holds that the annual labor of every nation is the fund which originally supplies it with what it annually consumes, and that the relative proportion which that produce bears to the consumers is the measure of their supply in the necessaries and conveniences of life; that the greatest improvement in the productive power, skill, and judgment of labor has arisen from the division of labor; that the extent of the division of labor is limited by the market for its products; and that labor is the only universal as well as accurate measure of value, or the only standard by which we can compare the values of different commodities at all times and in all places. He says that the demand for labor can only increase in proportion to the increase of the "funds destined for the payment of wages;" and yet, while justly holding that it is labor which supplies a people with what they consume, with a most remarkable inconsistency he says that "the attention of government never was so unnecessarily employed as when directed to watch over the preservation or increase of the quantity of money in any country." In his complicated and contradictory arguments respecting "stock"—which he says consists of two parts, that which the possessor "expects is to afford him revenue," which "is called his capital," and also that which supplies his "immediate consumption"—he involves himself in some of the most serious fallacies to be found in his book, the deductions from which are fatal to much of his system. No portions of his book need to be read with more care in order to escape error than those which treat of stock, or into which his theory of stock enters as an element. Money he terms "the great wheel of circulation, the great instrument of commerce," and adds, that it "makes a part and a very valuable part of the capital" of a country or people, and that when possessed of it we can readily obtain whatever else we have occasion for. "The great affair is to get money; when that is obtained, there is no difficulty in making any other purchase." Here, it will be observed, he recognizes the important fact that money possesses a quality not to be found in any other commodity: its universal acceptability among men, its power to purchase any thing which man desires to sell. In tracing the general progress of wealth, he illustrates the importance which the farmer gains by the diversification of industry as follows: "An inland country naturally fertile and easily cultivated produces a great surplus of provisions beyond what is necessary for maintaining the cultivators; and on account of the expense of land carriage, and inconveniency of river navigation, it may frequently be difficult to send this surplus abroad." When then workmen engaged in other pursuits settle in the neighborhood, "they work up the materials of manufacture which the land produces, and exchange finished work" "or the price of it for more materials and provisions." "They give a new value to the surplus part of the rude produce, by saving the expense of carrying it to the water side, or to some different market; and they furnish the cultivators with something in exchange for it that is either useful or agreeable to them upon easier terms than they could have obtained it before. . . . They are thus both encouraged and enabled to increase this surplus produced by a further improvement and better cultivation of the land; and as the fertility of the land had given birth to the manufacture, so the progress of the manufacture reacts upon the land, and increases the fertility." As the work improves, more distant markets are reached; "for though neither the rude produce, nor even the coarse manufacture could without the greatest difficulty support the expense of a considerable land carriage, the refined and improved manufacture easily may. In a small bulk it frequently contains the price of a great quantity of rude produce. A piece of fine cloth, for example, which weighs only 80 pounds, contains in it the price not only of the 80 pounds weight of wool, but sometimes of several thousand weight of corn, the maintenance of the different working people, and of their employers. The corn, which could with difficulty be carried abroad in its own shape is in this manner virtually exported in that of the complete manufacture, and may easily be sent to the remotest country of the world."—In 1798 appeared anonymously the first edition of "An Essay on the Principle of Population as it affects the Future Improvement of Society," the author of which was the Rev. T. R. Malthus. New revised and enlarged editions have since been published from time to time with the name of the author, the 6th and last in 1826. According to its preface this publication "owes origin to a conversation with a friend on the subject of William Godwin's essay on avarice and profusion in his 'Inquirer.'" In addition to an examination of the principle of population, and as a part of his subject, Malthus reviews the doctrines of Godwin as well as those of Condorcet, both of whom held to the possible progress of man toward future perfection, and a consequent reign of equality, peace, and justice. The doctrines of Godwin in the essay above referred to, and in his "Inquiry concerning Political Justice" (1793), respecting the unequal distribution of the things of this world among the people, were, in the words of a recent American writer, "among the boldest and sharpest protests against the defects and failures of the existing social organization, uttered with a calmness, sobriety, and force of reasoning, that were not to be met by de-

ouncing them as democratic and revolution-
ry, which sufficed for a reply to more intem-
erate writers." Impressed with the justice
f Godwin's protest, as based upon then exist-
g data, Malthus aimed to overthrow it by
resenting evidence that the inequality among
ankind was due to a natural law. Malthus's
eory "remains to this day," says the Ameri-
n writer already quoted, "as the strongest
pology of which despotism is capable." His
rinciple is that "population when uncheck-
d increases in a geometrical ratio, while
ubsistence increases only in an arithmetical
atio;" or, practically stated, that "in two
enturies the population would be to the
eans of subsistence as 256 to 9, in three
enturies as 4,096 to 13, and in 2,000 years
he difference would be almost incalculable."
e does little more than state his proposition,
hen, almost without presenting proof in re-
ard to the actual power of increase in man
nd food respectively, he proceeds to show
hat have been the checks to increase of pop-
lation throughout the various countries of
e world. Population, he holds, "is neces-
rily limited by the means of subsistence,"
nd "invariably increases where those means
crease, unless prevented by some very pow-
ful and obvious check." These checks he
vides into the positive and the preventive.
he former "include every cause, whether
ising from vice or misery, which in any de-
ree contributes to shorten the natural dura-
on of human life," among which may be
umerated "unwholesome occupations, severe
bor, exposure to the seasons, extreme pov-
ty, bad nursing of children, great towns, ex-
sses of all kinds, the whole train of common
seases, and epidemics, wars, plagues, and
mine." The preventive checks include ab-
inence from marriage and sexual intercourse
om considerations of prudence, and all vice
d immorality tending to render women un-
uitful. Few books have formed the subject
f greater discussion and controversy than
is; and it is difficult to say whether those
ho do or who do not now accept its doctrines
rm the larger number. One of the most de-
iled examinations of this book which have
en published is "The Law of Population,"
y Michael Thomas Sadler, M. P. (London,
30). In addition to an elaborate answer to
althus's theory, Mr. Sadler develops a doc-
ine of population. "The prolificness of hu-
an beings," he says, "otherwise similarly
rcumstanced, varies inversely as their num-
rs;" and he presents a mass of evidence to
ove that nature has not "invested man with
fixed and unvarying measure of prolificness,"
t that the Creator has "regulated the pro-
icness of his creatures in reference to the
rcumstances in which his providence shall
ace them, instead of leaving that regulation
the busy, selfish, and ignorant interference
f man." The Rev. Thomas Chalmers, D.D.,
ho had thoroughly imbibed the doctrines of
Malthus, published a volume "On Political Economy in connection with the Moral State and Moral Prospects of Society" (Glasgow, 1832). Fearing "a sweeping, headlong anarchy," he aimed to present the evidence of the "tremendous evil" of over population, and at the same time to appeal to his countrymen to take steps to "avert it from their borders." In 1841 Thomas Doubleday published in London "The true Law of Population shown to be connected with the Food of the People," in which he undertook to demonstrate that "whenever a species or genus is endangered, a corresponding effort is invariably made by nature for its preservation and continuance, by an increase of fecundity or fertility; and that this especially takes place whenever such danger arises from a diminution of proper nourishment," and that consequently "the deplethoric state is favorable to fertility, and that on the other hand the plethoric state is unfavorable to fertility." Thus "there is in all societies a constant increase going on among that portion of it which is the worst supplied with food; in short, among the poorest." "The Westminster Review" for April, 1852, contains "A New Theory of Population," by Herbert Spencer, deduced from the general law of animal fertility. It argues that an antagonism exists between individuation and reproduction; that matter in its lower forms, that of vegetables for instance, possesses a stronger power of increase than in all higher forms; that the capacity of reproduction in animals is in an inverse ratio to their individuation; that the ability to maintain individual life and that of multiplication vary in the same manner also. He further demonstrates that "the ability to maintain life is in all cases measured by the development of the nervous system." A volume entitled "Population and Capital," consisting of lectures delivered before the university of Oxford in 1833–'4, by George K. Rickards (London, 1854), contends by careful induction from facts that the truth is the very reverse of Malthus's theory; "that the productive power of a community tends to increase more rapidly than the number of its inhabitants."—It is probable that no work on political economy has been more extensively read or studied, or has exerted a larger influence in the formation of opinions in the United States at least, than Jean Baptiste Say's "Treatise on Political Economy, or the Production, Distribution, and Consumption of Wealth" (Paris, 1803; 5th ed., 1826). This treatise is in form the most scientific and methodical which had at the time of its publication appeared in any language. "If," says Say, "we take the pains to inquire what that is which mankind in a social state of existence denominates wealth, we shall find the term employed to designate an indefinite quantity of objects bearing inherent value, as of land, of metal, of coin, of grain, of stuffs, of commodities of every description. When they

further extend its signification to landed securities, bills, notes of hand, and the like, it is evidently because they contain obligations to deliver things possessed of inherent value. In point of fact, wealth can only exist where there are things possessed of real and intrinsic value. Wealth is proportionate to the quantum of that value; great when the aggregate of component value is great, small when that aggregate is small. . . . The knowledge of the real nature of wealth, thus defined, of the difficulties that must be surmounted in its attainment, of the course and order of its distribution among the members of society, of the uses to which it may be applied, and further, of the consequences resulting respectively from these several circumstances, constitutes that branch of science now entitled political economy." Subsequently Say published his lectures on the application of the science, under the title of *Cours complet d'économie politique pratique, suivi de mélanges* (Paris, 1828–'9). An examination of this book will show that he had materially altered his views in regard to the subject, and was now disposed to treat political economy as something higher and better than a mere science of wealth. "The object of political economy," he says in this later book, "seems heretofore to have been restricted to the knowledge of the laws which govern the production, distribution, and consumption of riches. And it is so that I have considered it in my treatise upon political economy, published first in 1803; yet in that same work it can be seen that the science pertains to every thing in society." In the same year in which Say's first treatise appeared, Sismondi published in Geneva his *Traité de la richesse commerciale*. At this time Sismondi was a decided follower of Adam Smith; "but," says a distinguished writer, "being an ardent friend of humanity, his views underwent a complete change in the progress of his investigations. No more pleasing task could be offered us than turning through the voluminous works of Sismondi for the evidences of his pure love of human welfare, and his detestation of the science of wealth apart from human well being."—At the request of Alexander I. of Russia Henri Storch prepared for publication his *Cours d'économie politique, ou exposition des principes qui déterminent la prospérité des nations* (St. Petersburg, 1815). "The emperor Alexander, having taken his lessons in political economy from M. Storch," says a recent writer, "determined to carry out in the administration of the empire the lessons he had learned in the closet; but the result proved most disastrous. British goods flowed in in a constant stream, and Russian gold flowed out; and the government was paralyzed, while the manufacturers were ruined. . . . Count Nesselrode issued a circular preliminary to a change of system, in which it was declared that Russia found herself forced to resort to a system of independent commerce; that the products of the empire no longer found markets abroad; that the manufactures of the country were exceedingly depressed; that the coin of the country was rapidly flowing out to distant nations; that the most solid mercantile establishments had become endangered; and that agriculture and commerce as well as manufacturing industry were not only paralyzed but had been brought to the brink of ruin." It was in 1824 that Russia again imposed heavier duties in opposition to the theories of M. Storch.—"The Principles of Political Economy and Taxation," by David Ricardo, which appeared in London in 1817, is held in high esteem among a large body of economists at the present day. The doctrines for which this work is most noted are the theory of rent and the consequent theory of value. The first of these, with which the name of Mr. Ricardo is now always associated, was announced in 1777 by James Anderson, a Scotchman, in a tract entitled "An Inquiry into the Nature of the Corn Laws;" and it seems to have been so completely overlooked and forgotten, that "when in 1815," says an English economist, "Mr. Malthus and Sir Edward West published their tracts exhibiting the nature and progress of rent, they were universally believed to have for the first time discovered the laws by which it is governed." The theories of rent and value, abridged from Mr. Ricardo's own statement, are as follows: On the first settling of a country in which there is an abundance of rich and fertile land, there will be no rent; for no one would pay for the use of land when there was an abundant quantity not yet appropriated. If all land had the same properties, if it were boundless in quantity and uniform in quality, no charge could be made for its use, unless where it possessed peculiar advantages of situation. It is only then because land is not unlimited in quantity and uniform in quality, and because in the progress of population land of an inferior quality or less advantageously situated is called into cultivation, that rent is ever paid for the use of it. When in the progress of society land of the second degree of fertility is taken into cultivation, rent immediately commences on that of the first quality; and the amount of that rent will depend on the difference in the quality of these two portions of land. When land of the third quality is taken into cultivation, rent immediately commences on the second, and it is regulated as before by the difference in their respective productive powers. At the same time the rent of the first quality will rise, for that must always be above the rent of the second, by the difference between the produce which they yield with a given quantity of capital and labor. "The most fertile and favorably situated land will be first cultivated, and the exchangeable value of its produce will be adjusted in the same manner as the exchangeable value of all other commodities, by the total quantity of labor necessary in various forms, from first to last, to produce it, and

ing it to market. When land of an inferior
ality is taken into cultivation, the exchange-
ble value of raw produce will rise, because
ore labor is required to produce it." "This,"
ys one of Mr. Ricardo's followers, "is the
ndamental theorem of the science of value,
d the clue which unravels the laws that reg-
ate the distribution of wealth." By reason of
ese theories of rent and value, if in accordance
ith the facts, the landlord would be enabled
command a steadily increasing rent as the
eld per acre declined, until he absorbed the
tire product of the land; and food would as
adily increase in cost as population increased.
arvation and wretchedness could not fail to
the lot of the mass of mankind under such
condition of things. These theories seemed
aid in accounting for the Malthusian princi-
e of population, and they at once took their
sitions as logically anterior to that doctrine,
d became the foundation of the system now
own as Ricardo-Malthusianism.—In 1821
mes Mill published "Elements of Political
onomy," which is to some extent a state-
nt and abstract elaboration of some of the
trines of Adam Smith and Ricardo in regard
production and distribution, and those of
ltus respecting population. Col. R. Tor-
ns published in 1821 his "Essay on the Pro-
ction of Wealth;" "long since," says Col-
ll, "placed on the list of unsuccessful efforts
settle this subject."—One of the most wide-
known writers on political economy and
tistics at the present time is J. R. McCul-
ch, who prepared the article for the supple-
nt to the "Encyclopædia Britannica," a sep-
ate edition of which appeared in 1825, and
hich has since passed to a 4th edition, under
e title of "The Principles of Political Econ-
my, with some Inquiries respecting their Ap-
ication, and a Sketch of the Rise and Prog-
s of the Science." "McCulloch," says Col-
ll, "belongs neither to the school of Say,
r to the still more refined and strict school
Tracy, Rossi, and Senior. He persists in
nsidering all the topics of political economy
om a practical point of view. He speaks of
science, it is true, but only in that popular
nse in which men speak of the science of
litics, which is a very different sense from
at in which it is employed by Rossi, Senior,
d J. S. Mill."—In the "Encyclopædia Metro-
litana" in 1836, and subsequently in a sepa-
te form, appeared "Political Economy" by
mas W. Senior, professor in the university
Oxford; the subject being, by the plan of
e "Encyclopædia," classed as among the pure
iences. The author of this treatise however
iled to confine his investigations strictly
thin these bounds. "We propose in the fol-
wing treatise," he says in opening, "to give
outline of the science which treats of the
ture, the production, and the distribution of
alth. To that science we give the name of
litical economy." He insists too on limiting
s inquiries to those subjects as the only true

and legitimate ones, and adds, that political economy does not treat of "happiness, but wealth." He even declines to examine into the effects upon society of the possession of wealth, what distribution is most desirable, or what are the means by which any peculiar distribution can be carried into effect by legislation. All of these questions are "of great interest and difficulty, but no more form part of the science of political economy, in the sense in which we use that term, than navigation forms part of the science of astronomy." The premises of the political economist he regards as consisting "of a few general propositions, the result of observation or consciousness, and scarcely requiring proof or formal statement, which almost every man, as soon as he hears them, admits as familiar to his thoughts, or at least as included in his previous knowledge; and his inferences are nearly as general, and, if he has reasoned correctly, as certain as his premises." The fundamental propositions in political economy Mr. Senior thus states: 1, every man desires to obtain additional wealth with as little sacrifice as possible; 2, the population of the world, or in other words the number of persons inhabiting it, is limited only by moral and physical evil, or by the fear of a deficiency of those articles of wealth which the habits of the individuals of each class of its inhabitants lead them to require; 3, the powers of labor, and of the other instruments which produce wealth, may be indefinitely increased by using their products as the means of further production; 4, agricultural skill remaining the same, additional labor employed on the land within a given district produces in general a less proportionate return; or in other words, though with every increase of the labor bestowed the aggregate return is increased, the increase of the return is not in proportion to the increase of labor. Mr. Senior belongs, as can be seen, to the school of Ricardo and Malthus, and believes with them in the limited powers of the earth.—The formation of the German *Zollverein* or customs union, of entire free trade among the several states composing the union, with such a policy as should protect their domestic production from external disturbance, was due to no man more than to Friedrich List. His "National System of Political Economy," first published in Stuttgart in 1841 (English by G. A. Matile, Philadelphia, 1856), is not built upon hypotheses, but upon observation and history. "Nationality," says the English translator, "is the ruling idea of the book; but with his vigorous mind and clear intelligence, he enlarges it until it comprehends every topic of human welfare."—One of the most distinguished of the English political economists of the present day is John Stuart Mill. He defines political economy to be "the science which treats of the production and distribution of wealth, so far as they depend upon the laws of human nature; or the science relating to the moral or psychological laws of the production and distribution of wealth." Again he says: "Political economy may be defined as follows, and the definition seems to be complete: The science which traces the laws of such of the phenomena of society as arise from the combined operations of mankind for the production of wealth, in so far as those phenomena are not modified by the pursuit of any other object." Accordingly, political economy is "essentially an abstract science," and its method "is the *a priori*." "It reasons," he contends, and "must necessarily reason, from assumptions, not from facts." "The conclusions of political economy, consequently, like those of geometry, are only true, as the common phrase is, in the abstract." "That which is true in the abstract is always true in the concrete with proper allowances." Not only "the method *a priori* is the legitimate mode of philosophical investigation in the moral sciences," but "it is the only mode." The *a posteriori* method, or that of specific experience, "is altogether inefficacious," although it may be "usefully applied in aid of the *a priori*." Therefore, "since it is vain to hope that truth can be arrived at, either in political economy or in any other department of the social science, while we look at the facts in the concrete, clothed in all the complexity with which nature has surrounded them, and endeavor to elicit a general law by a process of induction from a comparison of details, there remains no other method than the *a priori* one, or that of abstract speculation." "In all the intercourse of man with nature," proceeds Mr. Mill, "whether we consider him as acting upon it, or as receiving impressions from it, the effect or phenomenon depends upon causes of two kinds, the properties of the object acting and those of the object acted upon. Every thing which can possibly happen, in which man and external things are jointly concerned, results from the joint operation of the law or laws of matter, and the law or laws of the human mind." "There are no phenomena," he continues, "which depend exclusively upon the laws of mind; even the phenomena of the mind itself being partially dependent upon the physiological laws of the body." Mr. Mill acknowledges that "the laws of the production of objects which constitute wealth are the subject matter both of political economy and of almost all the physical sciences;" but he considers that political economy "presupposes all the physical sciences," and adds, that "it takes for granted that the physical part of the process takes place somehow." In other words, it matters not to political economy why, how, or under what circumstances these laws of matter operate. Mr. Mill's design in writing his "Principles of Political Economy" was to produce "a work similar in its object and general conception to that of Adam Smith; "to exhibit the economical phenomena of society in the relation in which they stand to the best social ideas of the present time." He is a full believer in the views of Locke, Hume, and Smith in regard to money; in those of Ricardo on rent, and Malthus on population. He combats with great energy what he terms protectionism, but acknowledges that there is one, and only one case, "in which, on mere principles of political economy, protecting duties can be defensible;" that is, "when they are imposed temporarily (especially in a young and rising nation), in hopes of naturalizing a foreign industry, in itself perfectly suitable to the circumstances of the country."—As early as 1[illegible] it will be found, some attention had been given in the then British colonies of North America to economic studies. In a "Letter from a Gentleman in Philadelphia to his Friend in London," published in that year, known to have been written by John Dickinson, afterward president of Pennsylvania, and a member of congress during the war of the revolution, the current of trade with the mother country, the extent to which that trade had exhausted the colonies of coin, the importance of an emission of paper money properly secured, the policy of promoting manufactures among themselves, and other questions of this character, are examined. On the organization of the government of the United States under the constitution in 1789, Alexander Hamilton was called to the administration of the treasury department. He took his place in the cabinet, Sept. 11, 1789; and on Jan. 14, 1790, he presented to the house of representatives a report on finance, which was followed on April 23 by one on duties on imports; on Dec. 14, on a national bank; and on Jan. 28, 1791, on the establishment of a mint. It would be difficult to find, among all the state papers or treatises on political economy which appeared before the close of the 18th century, any productions of this character surpassing these in a thorough knowledge of the subjects, clearness and precision of statement, and logical exactness. The report of Alexander J. Dallas, secretary of the treasury, to the house of representatives, Oct. 17, 1814, on the national finances, and that of Feb. 12, 1816, in regard to a general tariff of duties, may be mentioned as among the able economic state papers which have emanated from this government. The "Addresses of the Philadelphia Society for the Promotion of National Industry" (1819), and "The New Olive Branch" (1820), subsequently with other papers collected and published under the title of "Essays on Political Economy" (1822), by Mathew Carey, should here be mentioned. Having no taste for speculation in any form, Mr. Carey dealt almost entirely in facts, figures, and references to history; and thus reached the conviction that "there is a complete identity of interest between agriculture, manufactures, and commerce." The first formal treatise on the subject written in the United States is Daniel Raymond's "Thoughts on Political Economy" (Baltimore, 1820). The author endeavors, and with some success, to escape from the complications and inconsistencies of the economists. His examination of some of the arguments of Adam Smith in regard to stock is original, vigorous, and conclusive. John Rae, a Scotchman, published in Boston in 1834 "Statement of some New Principles on the Subject of Political Economy," which has been quoted and highly commended by John Stuart Mill in his "Principles of Political Economy," who says of it: "In no other book known to me is so much light thrown, both from principles and history, on the causes which determine the accumulation of capital."—In 1835 appeared in Philadelphia an "Essay on the Rate of Wages," the first of the works of Henry C. Carey, who argues, in opposition to Say, Malthus, Ricardo, and other economists, that "where wages are highest, there capital increases most rapidly," because in prosperous countries "there is a tendency to the more rapid increase of capital than of population." He took ground against regarding political economy as the science of wealth, and insisted upon considering its "great object" and "its chief claim to attention the promotion of the happiness of nations." This was followed by his "Principles of Political Economy" (3 vols., 1837-'40), in which he demonstrates that value is determined by the cost of reproduction, and that every improvement in the mode of producing any commodity tends to lessen the value of commodities of the same description previously existing. From this it follows that in all advancing countries accumulated capital has a constant tendency to fall in value when compared with labor; that labor is therefore steadily growing in its power to command capital, and *e converso* the power of capital over labor as steadily diminishing; that labor and capital in their combined action are continually producing a larger return for the same outlay, of which larger return an increasing proportion goes to the laborer, while the share of the capitalist diminishes in its proportion, but increases in amount, being taken from a yield so much increased. "No truth so luminous," says a recent writer, "as that contained in this grand law of distribution had ever lighted up the path of inquiry into social science. It gave the clue by which history is made intelligible and consistent, for it alone explains the possibility of that physical, social, and political progress through which all classes advance in their dominion over the power and the stores of nature, with a constant approximation toward equality in their relations toward each other." In 1848 appeared Mr. Carey's work entitled "The Past, the Present, and the Future." Its object was that of demonstrating the existence of a simple and beautiful law of nature governing man in all his efforts for the maintenance and improvement of his condition, which had thus far wholly escaped observation. That law was the one in virtue of which the work of occupation and cultivation of the earth had always of necessity commenced upon the higher, drier, and poorer lands, passing thence, with the growth of wealth and population, to the lower and richer soils, with constant increase in the return to labor. Here was a complete reversal of those assumptions of Malthus upon which he had based his idea of a growing difficulty of obtaining food, as well as of those of Ricardo, which had served as the foundation of his celebrated and generally admitted, though erroneous theory of rent. Further than this, it furnished demonstration of the accuracy of the theory of value and of the law of distribution previously announced by Mr. Carey and above referred to. Passing over several intervening books, we have to notice his last and most extensive one, "Principles of Social Science" (3 vols. 8vo., Philadelphia, 1858-'9). In this the distinction is most clearly drawn between the science, which treats of the natural laws governing the subject, and the art—political economy—by means of which the obstructions to the operation of those laws may be removed. The effect is seen in the breadth of his definition, as compared with that given by all other economists; the latter limiting their science to the discussion of the production and distribution of mere material wealth, while the former defines his subject as being "the science of the laws which govern man in his efforts to secure for himself the highest individuality and the greatest power of association with his fellow man." Man, it is thus seen, is the subject of social science, and he is distinguished from the lower animals by the fact that association is necessary to his existence; that each and every member of the human family is possessed of a distinct individuality, and his development becomes more and more complete as he is more and more enabled to combine and associate with his fellow men; that he is a responsible being, and capable of progress. The more numerous the differences in the demands of society, the more complete becomes the development of the individualities of its members, the greater is the power of association and combination, the more rapid the progress, and the more perfect the responsibility for the proper use of the faculties which have been developed. Here, as everywhere, it is shown that in variety there is unity, and that the nation which would have peace and harmony at home and abroad must adopt a policy which shall develop the infinitely various faculties of its people—the plough, the loom, and the anvil working together, each for the advantage of the others. The social laws are thus, according to Mr. Carey, identical with those which govern matter in all its various forms; differences everywhere exciting forces, forces exciting heat in matter and impulse in mind, and heat and impulse re-exciting motion. Nature's laws being thus universal, the branches of science constitute but one great and harmonious whole, the social parts demanding the same methods of study and investigation. The methodical study of nature does and of necessity must, take the place of the metaphysical. The third chapter of the book is devoted to an exposition of the great series of changes which the earth must undergo in furnishing the residence and support of vegetable, animal, and human life in the order of their respective appearances upon it, the relation and dependence of their various subsistence upon each other, and the circulation of the common elements of their structure, beginning with the disintegrated rock in its simplest forms, and thence ascending through vegetable and animal organisms to that of man, in which their greatest complexity and highest sphere are reached, and whence they are again set free to pass through that never ending circuit which constitutes the entire organic and inorganic creation, one perfectly balanced system of universal exchange—an incessant flux of the forms of matter in their ascent from the simple to the most complex, adjusted precisely to the growing requirements of the successive orders of being in the great scale of vital development. The inert earth with the air and water supplies the demands of vegetable growth, this in its turn supplying the sustenance of the animal world; plants and animals furnishing sustenance to man, and the higher forms of being never outgrowing or overtopping the lower from which they spring, and to which they must of necessity return. Such are the reciprocities of motion, force, and function, in which Mr. Carey finds an order and a system, which as he believes put to flight the doctrine of discords and disproportions announced by Malthus, and since adopted by so large a proportion of the economists of Europe. A chapter on the new doctrine of the occupation of the earth, already referred to, is followed by one devoted to an examination of the much discussed question of value; and an illustration of the breadth of Mr. Carey's views may be given in his definitions of some of the most important terms in general use among teachers of social science. Utility is the measure of man's power over nature. All the utilities developed centre themselves in man, with constant increase of his power, and as constant decline of values, which are but the measure of nature's resistance to the gratification of man's desires. Wealth consists in man's power to command the always gratuitous services of nature. Production consists in directing the forces of nature to the service of man. Every act of consumption is also an act of production, water being consumed in the production of air, air being consumed in the production of water, both being consumed in the production of plants, which in their turn are consumed in the production of men and animals, all of which are finally resolved into the elements of which they are composed, to go their round again in the reproduction of plants, animals, and men. Capital is the instrument by the aid of which the work is done, whether existing in the form of land and its improvements, ships, ploughs, mental development, books, or corn. Trade is the performance of exchanges for other persons, and is the instrument used by commerce, which consists in the exchange of services, products, or ideas by men with their fellow men. As men are more and more enabled to associate together, commerce increases, but the power of trade declines; the growth of the one being here, as in the case of utility and value, in the inverse ratio of the other. Nevertheless, all other economists use these words as being synonymous the one with the other. Money is regarded as the great instrument of association, power growing everywhere with increase in the ability to command the services of the precious metals. Price is the value of a commodity as measured by those metals. Prices of land, labor, and all raw materials tend to rise with every increase in the power of association, that increase being attended by decline in the prices of finished commodities. They tend therefore to approximate, and it is in the closeness of that approximation that Mr. Carey finds the highest evidence of advancing civilization. The definitions here given differ widely from those found in the works of all other economists; but wide as is the difference, it is not greater than that exhibited in Mr. Carey's order of development as compared with that most in vogue. According to the latter, agriculture precedes manufactures, which are followed by trade; whereas Mr. Carey shows, in a series of chapters in which he examines the course of many of the most important communities of the world, that trade appears first, to be followed by manufactures, and that it is not until the latter have been developed and a market is thus made in the neighborhood of the farm, that any real agriculture makes its appearance. The more complete the agricultural development, the greater is the tendency toward an influx of the precious metals, which like other raw materials tend always toward those places at which finished commodities are cheapest; leaving those at which employments are least diversified, to seek those at which association and combination have most existence. Circulating notes diminish the value of the precious metals, but increase their utility, with constant diminution in the rate of interest, and equally constant increase in the tendency toward equality among men, and strength in the communities of which they are a part. The power of accumulation is in the direct ratio of the rapidity of the societary movement, which increases with every increase in the power to maintain that direct commerce which may be carried on without the intervention of the trader. Power grows with every increase in the numbers that can obtain food from any given space; and here, passing over many important chapters, we reach the law of population propounded by Mr. Carey, characterized by great originality and simplicity. Agriculture, as has been seen, becomes more productive as men are more and more enabled to combine together. The more they can combine, the less is the waste of human power in the search for food, and the less the muscular effort required for procuring any given effect; the locomotive of civilized society doing the work that in savage life is done by the shoulders of the man, and the great steam mill grinding the grain that before had required the severest labor. Vegetable food is generally substituted for animal food; the tendency toward this substitution being always greatest in those communities in which growing wealth most manifests itself in the clearing, drainage, and culture of those rich soils which, according to Mr. Ricardo, are cultivated when men are poor, weak, and scattered, but which, according to Mr. Carey, are last brought under human power, their very wealth forbiddding their occupation by the early cultivator. Simultaneously with the changes thus observed, we find the vegetable taking the place of the animal world, and the inexhaustible mineral world taking the place of both; wool being superseded by cotton, flax and cotton superseding silk, gutta percha taking the place of leather, paper being substituted for parchment, coal expelling wood in its use as fuel, the steel pen being used instead of the animal one, the iron horse taking the place of the one of flesh and blood. As individuality becomes developed in man, he obtains from day to day increased power to command the services of nature, and is enabled to feed and clothe himself better; the treasury of nature being unlimited in extent, the supply furnished being in the direct ratio to his power to make demand, and that demand increasing with every step in the growth of the power of association. The more perfect the development of the latent powers of the earth, and the greater the development of mans' peculiar faculties, the greater is the competition for the purchase of labor, the greater is the freedom of man, the more equitable is the distribution of the products of labor, the greater is man's feeling of responsibility for his action in the present and of hope in the future. The higher that feeling, the greater is the tendency toward matrimony as affording the means of indulging affection for wife and children, and the love of home. Vital laws coöperating with the moral, the rational faculties are developed, and the propensities abated and overcome; thus placing man himself under the great and well established law in virtue of which the tendency to reproduction is always in the inverse ratio of development. "Such," says Mr. Carey, "are the various forces to whose combined operation we look for the proper supply of food and raw materials to the demand for them; those forces operating within and without the human system, and tending always to establish among its functions an orderly balance, while displaying their power in bringing up subsistence to the level with a demand that is itself constantly diminishing in its ratio to the numbers to be supplied." The Malthusian theory he holds to be irreconcilably inconsistent with the real laws of nature as seen in the occupation of the earth, and the relative powers of increase in vegetable life and in the lower forms of animal life and in man. The sphere of action of government in directing the commerce of the state is strictly limited to the removal of the obstacles to perfect combination and association. Real freedom of trade consists in the power to maintain direct commerce with the outside world. To reach it there must be a diversity of employments, enabling the exporting country to send its commodities abroad in a finished shape. Centralization, such as is established by the British system, is opposed to this, and therefore it is that that system is resisted by all the advancing communities of the world, they being enabled to advance in the precise ratio with their power to resist it. Protection being the form assumed by that resistance, its object may be properly defined as being that of establishing perfect freedom of commerce among the nations of the world. Societary organization furnishes additional evidence of the universality of nature's laws, for throughout her realms dissimilarity of parts furnishes conclusive evidence of the perfection of the whole—the highest organization presenting the most numerous differences. The higher the organization the more complete the subordination of parts, and the more harmonious and beautiful their interdependence; and the more complete that interdependence the greater the individuality of the whole, and the more perfect the power of self-direction. Such are the doctrines advocated by Mr. Carey; we devote a comparatively large space to them on account of their originality and present prominence.—The names and doctrines of most of the leading economists of Great Britain have been mentioned in the preceding pages. In France, among the more distinguished recent writers may be named Blanqui, Tracy, Louis Say, Droz, Rossi, Chevalier, Dunoyer, Garnier, Baudrillart, Bastiat, Fontenay, Coquelin, Foucher, Reybaud, Wolowski, with a host of others. Germany, although not so prolific in works of this character, has produced many. "The German eclectic works," says Colwell, "furnish a vast amount of well arranged information, and they may always be consulted with advantage. We would refer," he adds, "especially to the works of Schmalz, Jakob Vollgraff, Krause, K. H. Rau, Lotz, Hermann, and Schön; but there are others of equal merit." In Italy much attention has been given to political economy from an early period, and a collection of Italian economists in 50 vols. 8vo. was commenced at Milan in 1806, and completed in 1816. The *Biblioteca degl' economisti*, another collection of Italian and foreign writers, edited by Francesco Ferrara, professor of political economy in the university of Turin, is now in course of publication. A Spanish treatise well worthy of attention is "The Theory and Practice of Commerce and Maritime Affairs," by Geronymo de Uztariz (Madrid, 1724; English, 2 vols.

8vo., London, 1751). In the various universities and colleges of the leading countries of Europe this subject occupies an important position in the course of studies. In the United States treatises on political economy or branches of the subject have been published by Stephen Colwell, Prof. Tucker, Prof. Lieber, Prof. Vethake, Prof. Bowen, President Wayland, Calvin Colton, E. C. Seaman, George Opdyke, Condy Raguet, Peshine Smith, and many others; and some attention has been given to it as a branch of study in colleges.—Among the best books of reference on this subject may be mentioned "The Literature of Political Economy," by J. R. McCulloch (London, 1845), and *Dictionnaire de l'économie politique* (2 vols. 8vo., Paris, 1852–'3), a most complete, trustworthy, and valuable work. "A Dictionary of Political Economy, Biographical, Bibliographical, Historical, and Practical," by Henry Dunning Macleod, is now (1861) in course of publication in London, and will when completed probably extend to 1,500 pages large 8vo. Mr. Stephen Colwell's introductory essay to the American edition of List's "Political Economy" (8vo., Philadelphia, 1856) furnishes a view of what has been accomplished by its teachers, especially within the last 40 years.

POLIZIANO, Angelo, an Italian scholar and author, born at Monte Pulciano in the Florentine territory in 1454, died in 1494. Through the influence of Lorenzo de' Medici, under whose care he was educated, he became canon of St. Paul's cathedral, and at the age of 29 professor of the Latin and Greek languages at Florence, and also the teacher of Lorenzo's children. He stands at the head of the classical scholars who contributed to the revival of learning, and was equally distinguished for his Italian poetry. He made a Latin translation of the history of Herodian and other Greek works, and wrote *Orfeo*, the earliest represented secular drama in a modern language. His Latin works, along with 12 books of letters, were published in Paris (fol., 1512).

POLK, the name of counties in 8 of the United States. I. A N. W. co. of Ga., bordering on Ala., and drained by the Tallapoosa and other streams; area, about 500 sq. m.; pop. in 1860, 6,295, of whom 2,440 were slaves. It has an undulating surface and a light, sandy soil. Capital, Cedartown. II. A S. E. co. of Texas, intersected by Trinity river; area, about 1,200 sq. m.; pop. in 1860, 8,298, of whom 4,199 were slaves. Its surface is nearly level, and the soil along the Trinity very fertile. The productions in 1860 were 60,065 bushels of Indian corn, 13,881 of sweet potatoes, and 582 bales of cotton. There were 60 pupils attending public schools. Capital, Livingston. III. A W. co. of Ark., bordering on the Indian territory, watered by the Washita and several branches of Red river; area, about 1,000 sq. m.; pop. in 1860, 4,262, of whom 172 were slaves. It has a hilly surface and generally fertile soil. The productions in 1850 were 43,405 bushels of Indian corn, 1,892 of wheat, 4,084 of oats, 5,388 of sweet potatoes, 1,910 lbs. of tobacco, and 22 bales of cotton. There were 89 pupils attending public schools. Capital, Dallas. IV. A S. E. co. of Tenn., bordered E. by N. C. and S. by Ga., and drained by the Hiawassee river and one of its branches, the Tocoa or Ocoee; area, about 300 sq. m.; pop. in 1860, 8,726, of whom 434 were slaves. It has a mountainous surface and a moderately fertile soil. The productions in 1850 were 299,917 bushels of Indian corn, 51,572 of oats, 14,727 of wheat, 21,235 of sweet potatoes, 29,266 lbs. of tobacco, and 46,923 of butter. There were 5 grist mills, a saw mill, a tannery, 19 churches, and 700 pupils attending public schools. Capital, Benton. V. A S. W. co. of Mo., watered by the Pomme de Terre river, and branches of Sac river, beside several small streams; area, 750 sq. m.; pop. in 1860, 9,995, of whom 512 were slaves. The surface is undulating or level, and the soil fertile. The productions in 1850 were 308,000 bushels of Indian corn, 14,360 of wheat, 104,925 of oats, 17,173 lbs. of wool, and 60,212 of butter. There were 11 churches, and 864 pupils attending public schools. Capital, Bolivar. VI. A central co. of Iowa, intersected from N. W. to S. E. by the Des Moines river, and across the N. E. by the Skunk river, and watered also by the Raccoon and other branches of the Des Moines; area, 720 sq. m.; pop. in 1860, 11,625. It has a rolling surface and fertile soil. The productions in 1859 were 446,707 bushels of Indian corn, 13,129 of wheat, 7,548 of oats, 10,443 lbs. of wool, 157,896 of butter, and 7,542 galls. of sorghum molasses. Capital, Des Moines. VII. A N. W. co. of Wis., separated from Minn. on the W. by the St. Croix river, and drained by the Shell, Vermilion, Hay, and other rivers; area, 2,304 sq. m.; pop. in 1860, 1,400. It was formed in 1853. Capital, St. Croix Falls. VIII. A W. co. of Oregon, bordering on the Pacific ocean, bounded E. by the Willamette, and watered by the Nokas, Alseya, and La Creole rivers; area, about 1,000 sq. m.; pop. in 1860, 3,625. The soil is generally fertile. The productions in 1850 were 16,373 bushels of Indian corn, 1,605 of oats, 1,218 lbs. of wool, and 36,090 of butter. There were 154 pupils attending school. Capital, Cincinnati.

POLK, James Knox, an American statesman, and the 11th president of the United States, born in Mecklenburg co., N. C., Nov. 2, 1795, died in Nashville, Tenn., June 15, 1849. His ancestors, whose name was originally Pollock, emigrated from Ireland early in the 18th century, and settled on the eastern shore of Maryland, whence some of them removed to the western frontier of North Carolina shortly before the revolutionary war. The father of James K. Polk was a farmer in moderate circumstances, who in 1806 removed to Tennessee, and was one of the earliest settlers of the valley of Duck river, a branch of the Cumberland. The son received at first a scanty education, and was for a while a clerk in a store; but finally, his father consenting to give him a classical education, he entered the university of North Carolina, where he was graduated in 1818 with the distinction of being the first scholar of his class. On returning home he studied law in the office of Felix Grundy, and was admitted to the bar in 1820. He began practice in Maury co., and at the end of a year was already noted as an advocate. In 1823 he was chosen to the state legislature, and for two successive years was a leading member of that body. In 1825 he was elected a representative in congress by the democratic party, whose principles he always steadily maintained. He opposed federal appropriations for internal improvements, a protective tariff, and a national bank, and soon became one of the most conspicuous adversaries of the administration of President John Quincy Adams, while that of President Jackson received through its whole course his warmest support. On several questions of importance he was its most efficient advocate in the house of representatives. In the session of 1833-'4, as chairman of the committee on ways and means, he vindicated with much force the conduct of the president in ordering the removal of the public deposits from the bank of the United States. On the resignation of Mr. Stevenson as speaker toward the close of that session, Mr. Polk was nominated for the vacant chair by the democratic party, but was defeated by a coalition between the whigs and a portion of the democrats in favor of John Bell. At the beginning of the following session Mr. Polk was elected speaker, and was reelected in 1837 at the beginning of the extra session. For 5 sessions he presided as speaker; and at length in 1839, after having served for 14 years in congress, he declined a reëlection, and was chosen governor of Tennessee by a large majority over Governor Cannon. In the following year he received the nomination of the legislature of Tennessee and several other states as a candidate for vice-president with Mr. Van Buren, but at the election received only one electoral vote, Richard M. Johnson of Kentucky being in that contest the regular democratic candidate. In 1841, his term of two years as governor having expired, he was a candidate for reëlection under unfavorable circumstances, the state having given a whig majority of 12,000 at the presidential election of the previous year, and he was defeated by a majority against him of 3,224 votes. Two years later he was again a candidate, and was defeated by a similar vote. The democratic national convention for the nomination of candidates for president and vice-president, which met at Baltimore May 27, 1844, on the first ballot for president gave Martin Van Buren 146, Lewis Cass 83, R. M. Johnson 24, J. C. Calhoun 6, and 7 votes for other persons. Seven ballots followed, on the last of which Mr. Van Buren received 104 votes, Mr. Cass 114, and Mr. Polk 44. The Virginia and New York delegations then retired for consultation, and on their return it was announced that the Virginia delegation would give their entire vote for Polk, and that New York would withdraw the name of Van Buren and cast 35 votes for Polk. On the next ballot Mr. Polk received the unanimous vote of the convention for president, George M. Dallas of Pennsylvania being on the next day nominated for vice-president. These nominations had the effect of uniting the democratic party, which had been disturbed by dissensions between the friends and opponents of Martin Van Buren; and, on the basis of the annexation of Texas and the maintenance of the claim of the United States to Oregon, after a most animated canvass, in which Henry Clay and Theodore Frelinghuysen were the candidates of the whig party, Mr. Polk was elected in Nov. 1844, by a popular vote of 1,335,834 to 1,297,033 for Clay and 64,653 for James G. Birney, the anti-slavery candidate. The votes of the electoral colleges were: for Polk and Dallas, 170; for Clay and Frelinghuysen, 105. Mr. Polk was inaugurated March 4, 1845, and appointed as his cabinet James Buchanan, secretary of state; Robert J. Walker, secretary of the treasury; William L. Marcy, secretary of war; George Bancroft, secretary of the navy; Cave Johnson, postmaster-general; John Y. Mason, attorney-general. At the beginning of his administration the president found the country involved in disputes with Mexico, growing out of the recent annexation of Texas to the United States. He sent Gen. Taylor with a small force to occupy the country between the Nueces and the Rio Grande, the United States claiming the latter river as their boundary, while the Mexicans maintained that Texas had never extended beyond the Nueces. Gen. Taylor was instructed to commit no act of hostility against Mexico unless she declared war or became the aggressor. Meantime the question of the boundary of Oregon engaged the attention of the president and the people. "The whole of Oregon up to 54° 40'" had been one of the watchwords of the democratic party during the recent canvass; and Mr. Polk in his inaugural address had declared that "our title to the country of the Oregon was clear and unquestionable." After negotiation, however, the president directed the secretary of state to offer as the boundary the parallel of 49°, which after some demur was accepted by Great Britain, the proposition being so far modified as to give to that power the whole of Vancouver island. In April, 1846, hostilities broke out on the Rio Grande between Gen. Taylor's army and that of the Mexican commander, Gen. Arista. When the news reached Washington, the president sent a special message to congress declaring that "war existed by the act of Mexico," and asking for men and money to carry it on. Congress responded, May 11, by an appropriation of $10,000,000 and giving authority to call out 50,000 volunteers. Under the direction of Major-Gen. Scott the war was prosecuted with energy and success, and resulted in the entire conquest of Mexico, Santa Anna, the president and most distinguished general of that country, being defeated in several battles, and the city of Mexico itself occupied by the American forces on Sept. 14, 1847. By a treaty concluded in the following February, Mexico ceded to the United States New Mexico and Upper California, and accepted the Rio Grande from its mouth to El Paso as the S. boundary of Texas, thus adding in all about 800,000 square miles to the area of the republic. Soon after the termination of the war gold was discovered in California, an immense emigration thither took place, and the territory was consequently soon sufficiently peopled to claim admission as a state. Notwithstanding the brilliant success of the war, the elections for members of congress in 1846 and 1847 showed that the president had not maintained the popularity which he had enjoyed at the time of his election. In several of the states the war with Mexico was unpopular, being regarded as waged for the extension of slavery and without just cause. The passage in 1846 of a tariff act by congress, based on a revenue principle instead of a protective one like that of 1842, alienated large numbers in other states, especially in New York and Pennsylvania, and led to the gain by the whig party of several representatives from those states. On the organization of the territories acquired from Mexico a new disturbing element of the gravest character was introduced into congress by the question of the prohibition of slavery, the whig majority of the house of representatives being in favor of the "Wilmot proviso," by which slavery would be prohibited, while the democratic majority of the senate was opposed to any such restriction. The influence of this element was strongly manifested in the national conventions of 1848. Mr. Polk, in accepting the nomination of 1844, had unequivocally pledged himself not to be a candidate for renomination. He kept to his word, and in the democratic convention which met at Baltimore in May, Lewis Cass and William O. Butler were nominated respectively for president and vice-president. By the whig convention, which met at Philadelphia on June 1, Zachary Taylor and Millard Fillmore were nominated for the same offices. The whigs and democrats opposed to the extension of slavery combined in forming the free soil party in a national convention held at Buffalo, Aug. 8, 1848, at which Martin Van Buren and Charles Francis Adams were nominated for president and vice-president. The presidential election in the following November resulted in the triumph of the whig candidates, and the administration of Mr. Polk terminated March 4, 1849. Beside the Mexican war, the settlement of the Oregon boundary question, the acquisition and colonization of California, and the enactment of the tariff of 1846, the chief measures which distinguished his administration were the establishment of the independent treasury system, by which the revenues of the government are collected in specie without the aid of banks; the creation of the department of the interior; and the admission of Wisconsin as a state of the Union. Three months after his retirement from office Mr. Polk was seized with illness, and in a few days died. In person he was of middle stature, with a full, angular brow, and quick, penetrating eyes. He was grave but unostentatious in manner and amiable in disposition, and his private character was singularly free from stain or suspicion.

POLKA (Pol. *Polka*, a Polish woman, or Bohem. *pulka*, half), a dance first known at Gitschin, Bohemia, introduced in 1835 at Prague, and performed by Raab, a Bohemian dancing master, at the Odeon theatre in Paris in 1840. It is danced by two persons, advancing together, or whirling as in the waltz. The measure is in $\frac{2}{4}$ time, and the step is elevated, the foot being set down suddenly and almost stamping. Various modifications of this dance have been invented by Parisian dancing masters.

POLLEN, an organized substance filling the interior of the anther of a plant, and effective in developing the embryo so that it may become a perfect seed. The most common form of the pollen grain is spheroidal or triangular; in the umbelliferous plant it is oval; and in some compound flowers it is polyhedral. Structurally the pollen grain has been ascertained to consist of 2 or 3 layers, the outermost being thick, fleshy, and variously marked by ridges, tubercles, points, spines, bristles, or hairs symmetrically arranged, that of the passion flower having chinks; ordinarily, however, the surface is smooth and uniform. The internal layer is thin, membranous, and extensible. Within these layers is a cavity filled with a viscid fluid, sometimes transparent, sometimes rendered opaque by the minute granules (*fovilla*) which float in it. When the pollen grain, conveyed by the wind, by insects, or by other agencies, is lodged upon the stigma, its internal layer is protruded through the outer one in the form of tubes which elongate themselves rapidly and carry the fovilla downward until it reaches the ovule. This being effected, a change takes place in it by which the embryo is originated. The process is called impregnation, and without it no genuine seed can be produced. The ovule and ovary sometimes continue to grow and ripen into fruit without impregnation; but the seeds destitute of the embryo refuse to germinate and prove abortive.

POLLIO, Caius Asinius, a Roman general, orator, and poet, born in 76 B. C., died A. D. 4. He was descended from an obscure family of the Marrucini, and is first spoken of as having come forward at the age of 22 as the accuser of C. Cato, who was acquitted through the influence of Pompey. When the civil war broke out he joined the party of Cæsar, and was with that commander at the passage of the Rubicon and his subsequent march through Italy. Afterward he was sent to Sicily and Africa under Curio, who commanded the forces which drove Cato out of the former country; and when Curio was defeated and slain by Juba, Pollio collected the scattered troops and joined Cæsar. He was present at the battle of Pharsalia in 48, and probably the following year, on his return to Rome, was elected tribune of the people. In 46 and 45 he accompanied Cæsar in his African and Spanish campaigns, and subsequently was sent into Further Spain to carry on the war against Sextus Pompey. While he was there Cæsar was assassinated, and a peace was soon concluded between Pompey and the Romans. After Octavius had united with Lepidus and Antony in forming the first triumvirate, Pollio joined their party, and was nominated by them for consul in 40. When the division of the provinces was made, Antony assigned to him the charge of Transpadane Gaul with the duty of settling the lands among the veterans; and while engaged in this work he was enabled to save the property of Virgil. When Pollio became consul, the poet addressed to him his 4th eclogue. In 39 he was sent by Antony against the Parthini, an Illyrian people, and, being successful in the campaign, had the honor of a triumph. With this he closed his military life, devoting himself thereafter to literature, and occasionally delivering speeches in the senate and the courts of justice. When the war broke out between Augustus and Antony, Pollio declined the invitation of the former to accompany him in his campaign against his old commander, on the ground of his early friendship; and the validity of the excuse was admitted. Pollio occupied a high position in Roman literature as a historian and poet, although but few fragments of his writings have been preserved, including 3 letters to Cicero. He wrote a history of the civil war in 17 books, beginning with the year 60 B. C., and apparently extending down to the battle of Actium. He also wrote tragedies, commended by Virgil and Horace. As an orator, however, he was especially distinguished. He was a patron of many poets and writers, among whom were Virgil and Horace, and established a public library in Rome, in the *atrium libertatis* on Mt. Aventine, from the money procured in his Illyrian campaign.

POLLIO, Trebellius, one of the six writers of the *Historia Augusta*, flourished during the reign of Constantine. His name is prefixed to the lives of the two Valerians, Gallienus, the thirty tyrants, and Claudius; and, according to Vopiscus, the biographies written by him began with Philip.

PÖLLNITZ, Karl Ludwig, baron, a German writer of memoirs, born in Issum near Cologne, Feb. 25, 1692, died June 23, 1775. After having squandered his property, his restless disposition led him to travel over the greater part of Europe. At nearly every court his attractive qualities caused him to be well received, and he entered successively the military service of Austria, of the Papal States, and of Spain. He retained no place long until Frederic the Great chose him for his reader. In this situation, constantly exposed to the ill humor of the king, he was perpetually falling into disgrace, but succeeded in restoring himself to favor, and at last obtained the position of director of the theatre. He was three times converted to the Roman Catholic church, and finally died in that communion. His "Memoirs and Observations on his Travels through Europe" (translated from the French, 4 vols., London, 1737) has passed through several editions, and contains some of the best pictures of court life and intrigue in the 18th century. He wrote exclusively in French.

POLLOCK, a northern fish of the cod family, and genus *merlangus* (Cuv.). As in the cod, there are 3 dorsals and 2 anals, but these are triangular; there is no barbel under the chin; the head is more pointed, and the body more compressed and deeper; the gape large; the tongue fleshy and dark-colored, and the lower jaw the longer; minute teeth in both jaws, but only one row in the lower. The common pollock (*M. purpureus*, Storer) is from 1 to 3 feet long; the head and body above are greenish brown, the sides lighter, and the abdomen white; some smaller specimens are darker above, and reddish below; the ventrals white, anals marked with the same, and the other fins like the back. It is caught abundantly on the New England coast in spring and autumn; its flesh is rather soft, though delicate and nutritious, and from an unfounded prejudice among fishermen it is generally thrown away; when prepared in the manner of dun fish, with proper care and with good salt, it is an excellent fish, worth from $3 to $4 a quintal. The pollock of Europe (*M. pollachius*, Cuv.) is olive brown above the lateral line, on the sides dull silvery white mottled with yellow, and whitish below; dorsals and tail brown, the other fins edged with reddish orange. It abounds in the northern seas, especially on rocky coasts, and is esteemed as food; it is voracious like the rest of the family, eating the fry of other fish, mollusks, crustaceans, and radiates; it is gregarious when in pursuit of food. The black pollock (*M. carbonarius*, Linn.), or the coal fish, is from 1 to 3 feet long, black above, bluish white below the lateral line, and lighter on the abdomen; the lateral line silvery white. It is seen occasionally in our markets, and is found from the coast of New York to Davis's straits on the American side, and in the northern seas as high as Spitzbergen, in the Baltic, and about the Orkneys in Europe. The young in Europe are much esteemed as food by the poorer classes. It attains a weight of 30 lbs.; it swims rapidly, not very deeply, and is in the best condition from October to December, when it readily takes the hook. The northern pollock (*M. polaris*, Sab.) is a species about a foot long, inhabiting the arctic seas. The green pollock (*M. leptocephalus*, De Kay), from New York, is from 1 to 1½ feet long, deep green above the lateral line, and silvery white beneath with minute black dots.

POLLOK, Robert, a Scottish poet and prose writer, born at Muirhouse, Eaglesham parish, in Renfrewshire, in 1799, died near Southampton, Sept. 15, 1827. He was designed for the ministry, studied at the university of Glasgow, and was made a licentiate of the United Secession church in 1827. The severe mental labor he had undergone had so injured his constitution that he determined to make a journey to Italy for the sake of his health, but died before he had embarked. He wrote "Helen of the Glen," "Ralph Gemmell," and "The Persecuted Family," all of which appeared anonymously. The work on which his reputation rests is his poem entitled "The Course of Time," which was published by Blackwood of Edinburgh in 1827 on the recommendation of Professor Wilson. It soon went through many editions, and is yet popular as a religious work.

POLLUX. See Castor and Pollux.

POLLUX, Julius. I. A Greek grammarian and sophist, born at Naucratis in Egypt, flourished about A. D. 183. He studied at Athens, where subsequently he taught grammar and rhetoric. He was severely attacked by many of his contemporaries, especially Lucian and Philostratus. His only extant work is the *Onomasticon*, a dictionary of Greek words classified according to their subjects, with brief explanations of their meaning, and illustrative quotations from the ancient writers. II. A Byzantine author, who wrote a universal history, beginning with the creation of the world, which it discusses at some length, and extending to the reign of Valens, although one manuscript is said to continue the narration to the death of Romanus (963). It is a compilation, and devoted chiefly to ecclesiastical history. There have been two editions, of which the later is that of Hardt (8vo., Munich, 1792).

POLO, Marco, a noble Venetian traveller, born in 1250, died about 1324. He came of an adventurous family. His father Nicolo and his uncle Maffeo Polo sailed shortly before Marco's birth on a trading voyage to Constantinople, and having there exchanged their merchandise for jewels, crossed the Black sea to the Crimea and travelled overland to Bokhara, where they passed several years. Thence they went to Cathay, where Kublai Khan treated them with great honor, and finally intrusted them with an embassy to the pope. Reaching Italy after 19 years' absence, they found the papal chair vacant, and after waiting two years in vain for a new pontiff to be chosen, they set out for the East again in 1271, accompanied by Marco, who was now 21 years old. They passed through Palestine, and in Armenia were overtaken by a messenger from the new pope, Gregory X., who brought them presents and letters for the khan. Traversing the northern part of Persia, they journeyed by the city of Balkh and visited many parts of Tartary; but as they followed no direct track, turning aside now to avoid an inundation or a desert, now because of war, and again because they could not obtain guides, it is next to impossible to describe their route. In the Mohammedan province of Badakhshan Marco fell sick, and the party were detained a whole year. Resuming their journey toward the N. E., they came to the foot of a great mountain ridge, up whose sides they toiled for 3 days, when they found themselves on a vast table-land hemmed in by still loftier hills. From this plateau they proceeded to Cashgar, Yarkand, and Khoten, and reached the city of Lop or Lok on the borders of a great desert of the same name (the desert of Gobi). Crossing this desert, they arrived at Shatchen in Tangut, whence they travelled to the city of Karakorum. When they came within 40 days' journey of Cambalu (probably Peking), the capital of Cathay, they were met by an escort, and conducted with every mark of honor to the imperial city. The khan appointed Marco to an office about his person, and, when he was sufficiently instructed in the language and manners of the Mongols, despatched him on embassies to neighboring chiefs, in which he conducted himself with such prudence that he rapidly rose to higher distinctions. The northern provinces of China, western Thibet, the city of Lassa, then the seat of an active commerce, and the province of Khorassan, were successively visited by the young adventurer, who generally found the khan's favor a passport to the most secret and sacred places. His next expedition was to southern China, where he saw the capital Kinsai, reported to be 100 Chinese miles in circuit. This great city, whose size, allowing for the vast parks, gardens, market places, and open spaces enclosed in it, may after all have been not very extravagantly overstated, is probably the modern town of Hang-chow-foo. For 3 years Marco filled the office of governor of a large city in this part of the empire, and his father and uncle had meanwhile made themselves useful to the khan by instructing him how to make catapults and by other services, so that when the three Venetians asked leave to revisit their native country Kublai at first refused to part with them. At length they were dismissed loaded with wealth and promising to return. In their company was a Persian embassy which had just obtained the daughter of Kublai Khan for their king, and, being unable on account of war to travel by land, had accepted Marco's offer to transport them by water. Their fleet consisted of 14 ships of 4 masts, 4 or 5 of them carrying 250 men each. They touched at Ziambar, Borneo, Lokak, Sumatra, the Nicobar and Andaman islands, Ceylon, and the Carnatic, and sailing up the Persian gulf landed the princess, and were magnificently entertained by the Persian government for 9 months. They then prosecuted their journey by land through Koordistan and Mingrelia to

Trebizond on the Black sea, and taking ship again arrived at Venice in 1295. Bronzed by the suns of 24 years, dressed like Tartars, and speaking their native language with difficulty, it was long before they could persuade their friends of their identity. To convince them, they invited all their old associates to a magnificent entertainment, at which they received them in gorgeous oriental dresses of crimson satin. Putting these off after the guests were seated, they appeared handsomely clad in crimson damask, which was also exchanged after the first course for rich suits of crimson velvet. At the end of dinner, when the velvet was taken off, they were seen in the ordinary garb of the time, and the discarded dresses were divided among the guests. When the cloth was removed Marco exhibited the coarse Tartar garments which they had worn on their travels, and ripping them open took out such a profusion of jewels that the company no longer refused to acknowledge them, though the evidence might just as well have been taken to prove any thing else. They were now overwhelmed with distinctions, and received every mark of respect except having all their stories believed. Even on his death-bed Marco was urged to retract his alleged falsehoods; but he solemnly reaffirmed all his statements, and there is now no doubt that he spoke the truth. Maffeo became one of the principal magistrates of Venice. Marco was intrusted with the command of a galley in the fleet sent against the Genoese, who had appeared off the coast of Dalmatia, and was wounded in the ensuing engagement and carried prisoner to Genoa. During his captivity he dictated to a fellow prisoner the account of his travels, which was finished in 1298. It was probably written and first published in French, and translated into Latin during Marco's lifetime; but it is impossible to determine which of the several discrepant texts in French, Italian, and Latin deserve the name of original. The French and Latin were published by the Paris society of geography in 1824. The work has appeared repeatedly in all the principal European languages. One of the best English versions is that of Marsden, which has been published with notes and commentaries in Bohn's "Antiquarian Library." After 4 or 5 years' detention Marco was set at liberty and returned to Venice, where he married and had two daughters. Marco Polo was not only a veracious but an exceedingly observant traveller, and his narrative is one of the most entertaining of its class ever published. He was the first to make known to Europeans the existence of Japan.

POLTAVA. See PULTOWA.

POLYANTHUS (Gr. *πολύς*, many, and *ἄνθος*, a flower), the name of a variety of the oxlip (*primula elatior*, Jacquin), having brown flowers, which grow in an umbel upon a common scape. The sub-varieties of the polyanthus are almost innumerable, having been selected from peculiarities which agree with an artificial standard of excellence established by florists. In its natural condition the oxlip is to be found occasionally in England, but is more common in the thickets in mountainous pastures of Europe. It has a fleshy and divaricating rootstock with fleshy fibres, from the crown of which issue many toothed and hirsute green leaves, oblong lanceolate in shape, and from their bosom one or more flower stalks about 6 inches high, bearing at the top several pale yellow flowers. The calyx is tubular and 5-pointed, the corolla hypocrateriform and swollen at base; the stamens 5 with short filaments; a single style with a globose stigma; the fruit a capsule full of small brown seeds and enclosed in the persistent calyx. It belongs to the natural order of *primulaceæ*, which embraces a great many beautiful flowering species. Though often treated as a pot plant, the polyanthus succeeds best in the open ground, preferring a soil inclining to clay, but rich and moist. If seed is needed, the strongest and best flowers should be selected and the rest cut away; when ripe it may be kept in the capsule till the time of sowing. Shallow boxes are filled with sifted compost, upon which the seeds are thinly strewn, and a thin coat of compost is carefully laid upon them. A uniform degree of coolness and moisture is best until the young plants have acquired 2 or 3 rough leaves, when they are to be pricked out into large pots and kept in frames as a protection from too much sunshine and heavy rains. When the beds in the open ground have been properly prepared some weeks after, the plants may be carefully transplanted a second time; and on their becoming accustomed to the bedding out, they are to be watched that slugs, worms, and vermin do not destroy the foliage, removing all weeds meanwhile. Protection from cold in winter and early spring will be found necessary to insure success. The cultivation of the polyanthus as a fancy flower originated among the Dutch.—The name of polyanthus is likewise applied to the many-flowered species of daffodil.

POLYBIUS, a Greek historian, born probably about 204 B. C., died about 122. His father was Lycortas of Megalopolis, one of the chief men of the Achæan league, who after the death of Philopœmen became its head. Under the influence and training of his parent he grew up in the knowledge of the science of war and of politics. In the war which sprang up between the Romans and Perseus of Macedon he favored a neutral policy; but when it was deemed advisable by the league to offer assistance to the Romans, he was appointed strategus of the cavalry, and sent to Macedonia to communicate the determination to the Roman consul. The offer was declined, but after Perseus and the Macedonians had been conquered, Caius Claudius and Cneius Dolabella came to the Peloponnesus as commissioners on the part of Rome, and by their orders 1,000 Achæans were carried to Rome to be tried for the crime of not having aided the Romans against the Macedonians. Among these was Polybius. On their arrival in 167 they were distributed throughout the principal towns of Etruria; but through the influence of Fabius and Scipio, the sons of Æmilius Paulus, permission was given Polybius to dwell in their father's house at Rome. Here a strong friendship sprang up between the historian and Scipio, then only 18 years old. After the Achæan exiles had remained in Italy 17 years, the Roman senate granted them leave to return, and Polybius accompanied the 300 survivors of the original 1,000 exiles to their native country. There all his efforts were employed in opposition to the party who were endeavoring to plunge his country into a war with the Romans; but his advice was disregarded, though on a statue subsequently erected to his memory was the inscription that "Hellas would have been saved if the advice of Polybius had been followed." Having joined Scipio, and been present at the destruction of Carthage, he hastened to Peloponnesus after the reduction of Achaia by the Romans, and did so much to mitigate the severity of the victors, that statues in his honor were erected at Megalopolis, Mantinea, Tegea, and other cities. But little is known of the rest of his life, and it has not been ascertained at what precise period he made his various journeys. He accompanied Scipio on his expeditions, and Pliny informs us that the latter furnished his friend with a fleet during the third Punic war, for the purpose of exploring the African coast. It has been surmised that he was present at the capture of Numantia in 133, as according to Cicero he wrote a history of the Numantine war. He also wrote a life of Philopœmen, a treatise on tactics, and another on the equatorial regions. His great work, however, is his history, which consisted of 40 books, and embraced an account of the growth of the Roman power from 220 B. C., where the histories of Timæus and Aratus of Sicyon left off, to 146, the year of the destruction of Corinth. It was divided into 2 parts, which probably were afterward united. The first 2 books are taken up with a history of Rome from the capture of the city by the Gauls to the beginning of the second Punic war, and the first part ends with the conquest of Perseus and the downfall of Macedon. The second part, which may be styled a supplement to the first, reviews the Roman policy, and carries on the narration of events to the downfall of Grecian liberty. Of this work only 5 books remain entire, but fragments of the rest are still extant, many of which are long. The style of Polybius is by no means pure, and in his treatment of his subject he is too didactic; but his judgment was good, and he made great efforts to render his narration accurate. The 5 entire books were first printed at Rome in 1473, in a Latin translation. In 1609 Casaubon printed at Paris an edition, in which all the fragments up to that time discovered were incorporated. The edition of Schweighäuser (8 vols. 8vo., Berlin, 1789–'95) contains a Latin translation and a valuable *Lexicon Polybianum*. The text of this edition was reprinted at Oxford in 1823 in 5 vols. 8vo., with the lexicon. The last edition is that of Immanuel Bekker (2 vols. 8vo., Berlin, 1844), who has added the fragments discovered by Cardinal Mai in the Vatican library at Rome. The best English translation of Polybius is by Hampton (2 vols. 4to., 1772).

POLYCARP, one of the early Christian fathers, born probably in Smyrna about the close of the reign of Nero, put to death in 1[illegible]. He was educated at the expense of Calista, a noble Christian lady of Smyrna, and became a disciple of St. John the evangelist, who on the death of Bucolus consecrated him to the bishopric of his native city. It was probably of Polycarp, the "angel of the church in Smyrna," that the apostle wrote that passage in the Apocalypse: "I know thy works, and tribulation, and poverty (but thou art rich). . . . . Fear none of those things which thou shalt suffer. . . . . Be thou faithful unto death, and I will give thee a crown of life." When the controversy about the celebration of Easter began to run high, he went to Rome to consult Anicetus, who then occupied that see; and though he did not succeed in reconciling the differences between the eastern and western churches, his conferences with Anicetus were conducted in the most amicable manner. He distinguished himself at Rome by his opposition to the Marcian and Valentinian heresies, stopping his ears, as Irenæus relates, whenever false doctrines were uttered in his presence, and exclaiming: "Good God, to what times hast thou reserved me that I should hear such things!" During the persecution under Marcus Aurelius he was seized and carried before the Roman proconsul at Smyrna. Being urged to curse Christ, he replied: "Six and eighty years have I served him, and he has done me nothing but good, and how could I curse him, my Lord and Saviour! If you would know what I am, I tell you frankly, I am a Christian." At these words the populace cried out that he should die at the stake, and hastened to bring fuel for the fire. He refused to be fastened, and met his fate with fortitude and calmness. A contemporary narrator relates that when the fire was kindled the flames disposed themselves around him in the semblance of an arch, leaving his body untouched; upon which a spearman pierced him through, and blood flowed from the wound so profusely as to put out the fire; "and then a dove was seen to fly from the wound, which some suppose to have been his soul clothed in a visible form at the time of its departure." Polycarp wrote several homilies and epistles, all of which are now lost except a short epistle to the Philippians, chiefly valuable as a means of proving, by its use of scriptural phraseology, the authenticity of most of the books of the New Testament. In the time of St. Jerome it was read in the public assemblies of the Asiatic churches.

POLYCLETUS, a Greek sculptor and architect, born probably at Sicyon about 480 B. C. He was a citizen of Argos, and is said to have been the pupil of the Argive Ageladas, in whose school Phidias and Myron were his fellow students. He stood at the head of the schools of Argos and Sicyon, and was judged to have surpassed Phidias in some respects, Phidias being superior in images of the gods, and Polycletus unsurpassed in those of men. His statue of Juno in the temple between Argos and Mycenæ was thought however by Strabo to be equal to the Jupiter and Minerva of his great rival. The goddess was seated on a throne, her head crowned with a garland on which were wrought the Graces and the Hours. The head, breast, arms, and feet were of ivory, and the robe which covered the figure from the waist downward was of gold. A statue which he executed, representing a guard of the king of Persia, was so exquisitely proportioned that it was called the canon or rule, and artists came from all parts to study it. Polycletus also wrote a treatise on the proportions of the human form. He was acknowledged to be the greatest architect of his time, and designed the theatre at Epidaurus, which Pausanias pronounced the finest of Greek and Roman theatres.

POLYCRATES, a Greek tyrant of Samos, celebrated for success in all his enterprises, killed in 522 B. C. In conjunction with his brothers Pantagnotus and Syloson, and with only 15 armed men, he seized the sovereignty of Samos. Having assassinated one brother and banished the other, he strengthened the city, enlisted 1,000 archers and manned 100 galleys, and made war with unvarying success upon the neighboring territories. According to Herodotus, Amasis king of Egypt, his friend and ally, wrote to him to sacrifice his most valued possession in order to forestall the misfortunes that Nemesis must have in store for him. Polycrates accordingly threw into the sea a ring of marvellous value; but after some days the ring was found in the stomach of a fish which had been presented to the tyrant. Amasis, more fearful than ever, then broke off his alliance. Grote, however, thinks it more likely that it was Polycrates who broke the alliance in order to cultivate the friendship of Cambyses, to whom he furnished 40 galleys for the invasion of Egypt. He afterward sustained himself at the same time against an insurrection in his own city and the attack of the Spartans and Corinthians from without; but Oroetes the satrap of Sardis, having lured him into Magnesia under the pretext that he wished with his assistance to revolt, he was seized upon his arrival and crucified.

POLYDORE VERGIL. See VERGIL.

POLYGAMY (Gr. πολύς, many, and γαμεῖν, to marry), a state in which a man has at the same time more than one wife, or a woman more than one husband. The latter custom, sometimes called polyandry, prevails in Thibet and a few places elsewhere. The former has existed from time immemorial, especially among the nations of the East. It prevailed before the flood (Gen. iv. 19), was common among the patriarchs, and was tolerated by the laws of Moses (Exod. xxi. 9, 10, and Deut. xxi. 15). The custom, however, appears to have died out, for in the New Testament we meet with no trace of it, and the passages which refer to marriage seem to imply that monogamy was alone lawful. There are no positive injunctions in the Bible against the practice. In the East the custom has been almost universal, being sanctioned by all religions, including that of Mohammed, which allows a man to have 4 wives; but the permission is rarely used except by the rich, and the Arabs scarcely ever have more than one wife. Voltaire, Montesquieu, and others have accounted for the custom on the ground of the premature old age of the female sex in those regions, and Montesquieu also on the ground that the number of females there is much larger than that of males; but this assertion, though supported by the authority of several travellers, seems to be devoid of truth. Among the Greeks, at least of later times, polygamy was never practised, although in the Homeric age it seems to have prevailed to some extent. In republican Rome it was not known; but during the existence of the empire the prevalence of divorce gave rise to a state of things almost analogous with it. In the Christian church it has never been tolerated. It prevailed among the barbarous nations of antiquity, with the exception of the Germans, who, Tacitus says, "almost alone among the barbarians, are content with a single wife."—In England the punishment of polygamy was originally in the hands of the church. A statute of Edward I. placed it among the capital crimes; but it did not come entirely under the control of the temporal power until a statute of James I. made it punishable with death like other cases of felony. By a statute of George III. it was made punishable with imprisonment or transportation for 7 years. By the laws of ancient and modern Sweden the penalty is death. The Prussian code of 1794 subjected the criminal to confinement in a house of correction for not less than one nor more than two years. In the United States, the punishment varies in the different states, being usually imprisonment for a certain period, or fine, the second marriage being of course a nullity. In these countries, however, the term bigamy is most in use, as the plurality seldom extends beyond two; and in legal proceedings it is even employed where that number is exceeded.—In modern times polygamy has had some defenders, most of whom have grounded their defence on the absence of an express prohibition in the Scriptures. Bernardus Ochinus, general of the Capuchin order and afterward a Protestant, published in the 16th century "Dialogues in favor of Polygamy," to which Beza replied.

A still stronger view was taken in a work called *Polygamia Triumphatrix*, published at London by John Lyser, a Lutheran divine (1692). It was boldly maintained in a treatise called *Thelyphthora*, by the Rev. M. Madan, who however limited the privilege to men. He claimed that St. Paul's injunction that a bishop "should be the husband of one wife," implies that other men should have as many as they choose. Singularly enough, the Mormons, the only sect among Christian nations in which this custom is still practised, explain this same passage as meaning that a bishop should be the husband of one wife at least, and that there is no prohibition of his having more if he wishes. Polygamy was introduced among the Mormons by a revelation of Joseph Smith in 1843, but for some years existed as a secret institution. One principal ground upon which it is defended is, that unmarried women can in the future life reach only the position of angels, who occupy a very subordinate rank in the Mormon theocratic system, being simply ministering servants to those more worthy.

POLYGLOT (Gr. πολυς, many, and γλωττα, a tongue), a book with versions of its text in several languages. In common use the word is generally restricted to the Bible. The *Biblia Hexapla* of Origen is regarded as the first polyglot, though only two languages are used in it. Only some fragments of this work have come down to us, and these were published at Paris in 1714. In 1501 Aldus Manutius planned a polyglot in Hebrew, Greek, and Latin, but only one sheet of it was printed. The Complutensian polyglot is the earliest of the several Bibles properly called polyglots. It was printed at Complutum, the Latin designation of Alcala in Spain, at the expense and under the superintendence of Cardinal Ximenes, by whom it was dedicated to Pope Leo X. Seven learned men were employed upon the work. Though begun in 1502 and finished in 1517, it was not published until 1522, in 6 vols. fol. In the Old Testament each page contains 3 columns. Upon the left-hand page are the Hebrew, the Vulgate, and the Septuagint; and upon the right-hand page, the Septuagint, the Vulgate, and the Hebrew. There are Hebrew primitives in the outer margin, and a Latin interpretation of the Septuagint at the top of the page; at the bottom of the page is a Chaldaic paraphrase, with a Latin interpretation in 2 columns. In the New Testament each page has the Greek text and the Latin Vulgate in separate columns, with marginal references. Of this work only 600 copies were printed, and it is now very scarce. The Antwerp polyglot was printed by Christopher Plantin, at Antwerp (8 vols. fol., 1569–'72). The work was conducted by Arias Montanus, who had about 60 assistants, and was published under the sanction of Philip II. of Spain. It is doubtful whether the king undertook the expense, or only lent Plantin the money. This Bible contains the whole Complutensian polyglot, with a second Chaldaic paraphrase of a part of the Old Testament, a Syriac version of the New Testament, and the Latin translation of Sanctes Pagninus, altered by the editor Arias Montanus. Vols. vi., vii., and viii. consist of lexicons and grammars. Of this polyglot 500 copies were printed, and the greater number of these were lost at sea on their way to Spain, so that it is even more scarce than its predecessor. A third was printed at Paris by Antoine Vitré (10 vols. large fol., 1628–'45), edited by Guy Michel le Jay, who had several learned associates. This work contains all that is in the Complutensian and Antwerp polyglots, with an Arabic version of the Old and New Testaments, a Syriac version of the former, and the Samaritan Pentateuch. A work superior to all these is the London polyglot, edited by Brian Walton (6 vols. large fol., 1654–'7). In the course of this work 9 languages are used, viz.: Hebrew, Chaldaic, Samaritan, Syriac, Arabic, Persian, Ethiopic, Greek, and Latin. No one book, however, is given in all these, but portions of the work are printed in 7 languages, all open at one view. The polyglot most accessible to scholars is the one known as Bagster's, published by the London bookseller of that name (1 vol. fol., 1831). This gives the Old Testament in 8 languages, and the New Testament in 9. Eight languages are exhibited at one view, viz.: Hebrew, Greek, English, Latin, German, Italian, French, and Spanish. The New Testament in Syriac, the Samaritan Pentateuch in Hebrew characters, the notes and readings of the Masorite, and other variations, are appended. A polyglot known as Hutter's Bible, extending however only to the end of the book of Ruth, was printed at Hamburg in 1599, in 6 languages, and a Testament in 12 languages, viz.: Hebrew, Chaldaic, Greek, Latin, German, Bohemian, Italian, Spanish, English, French, Danish, and Polish. Two editions of the Pentateuch were printed at Constantinople, one in 1547, the other in 1551, with versions of the text in 4 languages, but all in Hebrew characters. A copy of the Lord's prayer was printed at Paris in 1805 by M. Marcel in 90 different languages, and with characters proper to each. This work was prepared as a compliment to Pope Pius VII. during his sojourn in Paris, and was a masterpiece of typography.

POLYGNOTUS, a Greek painter, born in the island of Thasos about 493 B. C., died about 426. On Cimon's return to Athens from the expedition against Thasos in 463, Polygnotus accompanied him, and was employed by him in the decoration of the temple of Theseus, the Anaceum, and the Pœcile. About 460 he was engaged with Phidias on the temple of Athena Area at Platæa, where in conjunction with Onatas he painted the walls of the portico. Soon after the death of Cimon he went with other artists to Delphi to decorate the edifices connected with the great temple. He returned to Athens in 425, and was employed upon the Propylæa. Polygnotus painted both on walls, and, in the more usual manner of Grecian artists, on panels, which were afterward let into the walls. In the Stoa Pœcile at Athens he represented the Greeks, after the fall of Troy, assembled to judge the case of Cassandra's violation by Ajax. In the Anaceum, or temple of the Dioscuri, he painted the "Marriage of the Daughters of Leucippus." Polygnotus was recognized in his time as at the head of his art. He was the first who gave any variety to the expression of the countenance, or any ease or grace to the outlines of figures or the flow of drapery. According to Pliny, he was the first who used the *sil* or yellow ochre found in the Attic silver mines, and he also made a new pigment of black from the husks of pressed grapes.

POLYHYMNIA (Gr. πολύς, many, and ὕμνια, dreams, or μνεία, memory, or ὕμνος, hymn), in Greek mythology, one of the nine Muses. She presided over rhetoric and the higher lyric poetry. The invention of rhythm was ascribed to her, and her attribute is therefore a lyre. Upon ancient monuments she is represented in an attitude of meditation, the chin reposing upon the right hand.

POLYNESIA, a name applied by geographers to all the islands north or south of the equator, lying between the Philippines, New Guinea, New Britain and neighboring islands, Solomon's islands, New Hebrides, and New Zealand, and the W. coast of America. The principal islands included in Polynesia are the Sandwich, Society, Marquesas, Paumotu, Navigators', Friendly, Feejee, Ladrone, Marshall, and Gilbert groups. The term Polynesia (Gr. πολύς, many, and νῆσος, island) was given by French geographers to the various islands scattered over the Pacific, including Australia; but latterly it has been restricted to the limits here defined.

POLYNICES. See Eteocles.

POLYP (Gr. πολύς, many, and πούς, foot), a name formerly applied to the 3 classes of *radiata*, the coral animals and *actiniæ*, jelly fishes or *medusæ*, and the echinoderms (star fishes, sea urchins, and holothurians). The name as thus extended was given from the numerous prehensile organs around the mouth, like those of the cephalopods (cuttle fishes); now it is generally restricted to the first class, called zoophytes by Prof. J. D. Dana in his "Report" (8vo., New Haven, 1859). He defines polyps as radiated animals, usually attached at the base, with a coronet of tentacles above and a toothless mouth in the centre, with an inner alimentary cavity to which the mouth is the only opening; they are hermaphrodite, reproducing by buds and eggs, with very imperfect circulation and no special organs of sense. He divides them into 2 orders, *actinoidea* and *hydroidea*; but as the latter have been shown by Agassiz to be related rather to acalephs than to polyps, the present article will be chiefly devoted to the former. The *actinoidea* are characterized by a visceral cavity enclosing the stomach, and divided into compartments by radiated plates having reproductive functions, the ovules being rejected through the mouth. They include 2 sub-orders, *actinaria* and *alcyonaria*; the former have 6, 12, or more tentacles, with few exceptions not papillose, perforated at the apex; often coralligenous; coralla calcareous, very rarely corneous, the cells radiate with lamellæ. They include the following tribes: I. *Astræacea*, with many tentacles in imperfect or scattered series; when gemmiparous, gemmation is superior, the polyps widening above. Here belong the families *actinidæ* (the non-coralligenous and usually attached *actiniæ* or sea anemones), the calcareo-coralligenous *astræidæ* (like *astræa* and *meandrina* or star and brain coral), and the coralligenous *fungidæ*. II. *Caryophyllacea*, having numerous tentacles in 2 or more series; mostly gemmiparous, the gemmation inferior and the buds lateral; embracing the coralligenous families *cyathophyllidæ*, *caryophyllidæ*, and *gemmiporidæ*, and the non-coralligenous *zoanthidæ*. III. *Madreporacea*, having tentacles, usually 12, in a single series; gemmiparous, gemmation lateral; with the coralligenous families *madreporidæ*, *favositidæ*, and *poritidæ*. IV. *Antipathacea*, having 6 tentacles, forming at the base corneous secretions; with the single family *antipathidæ*, the animals of which are fleshy, enveloping a corneous spinulous axis. In the sub-order *alcyonaria* the animals have 8 papillose tentacles, the papillæ perforate at apex, often coralligenous, with coralla calcareous or corneous and rarely silicious, and the cells never radiate within. It includes the families *pennatulidæ* (sea pens and rushes), either free or with the base buried in the mud; *alcyonidæ* (sea paps and dead man's hands), fleshy, usually with scattered calcareous granules; *cornularidæ*, forming corneous tubular coralla; *tubiporidæ* (organ corals), forming calcareous tubular coralla; and *gorgonidæ* (sea fans and shrubs), forming basal epidermic secretions, and often other tissue secretions separable from the former. (See Actinia, and Coral, for details of structure and mode of growth.) The order *hydroidea* is characterized by a simple internal cavity, and ovules growing outward from the sides; it includes the families *hydridæ*, *sertularidæ*, *campanularidæ*, and *tubularidæ*.

POLYPHEMUS, in classical mythology, the principal of the Sicilian Cyclops, a son of Neptune, who is represented by Homer as a shepherd dwelling alone in a cave. Ulysses and his followers having taken refuge in this place, they were discovered by Polyphemus on his return from feeding his flocks, and by him were fastened in the cave with a huge stone. Having eaten two of them for supper and two more for breakfast, he then went off to pasture his flocks; and when he came back Ulysses succeeded in rendering him intoxicated, in which condition he fell asleep. Hereupon

Ulysses bored out the single eye of the monster, and the next morning fastened himself and his companions to the bellies of the gigantic sheep as the blind Cyclops let them out to pasture, and thus escaped.

POLYPUS, a name applied in pathology to various morbid growths projecting into the mucous cavities and passages, having their origin either in or beneath these membranes. These growths or excrescences may be in the vicinity of the natural openings of the body, as in the nasal fossæ and rectum, and therefore within the sight and reach of the surgeon; or interior, as in the uterus, bladder, &c., inaccessible to his eye and very often to his instruments. They are usually single, sometimes multiple; their extent is very variable, according to their time and freedom of growth, and their surface may be inflamed or ulcerated. There are two principal varieties of form: the pediculated, with a more or less long and narrow neck, as in the nasal passages; or sessile, in which the morbid mass simply raises the tegumentary membrane. Some are easily crushed, others are very hard. In the soft, mucous, or vesicular polypus, the appearance is semi-transparent, gelatinous, consisting of a mass of areolar tissue, containing an albuminous fluid, covered by a thin adherent membrane; it sometimes contains vesicles; the vessels are few and fine. Themselves insensible, these tumors trouble only by their volume, rarely cause hæmorrhage, irritation, inflammation, or any grave symptom, and do not degenerate into malignant disease; they are also hygrometrical, growing larger in damp weather; nothing positive is known as to their causes. A more solid form of polypus consists of a concrete, grayish albumen, enclosed in areolar tissue, covered by a slightly vascular membrane. In the spongy polypus the tissue is soft, red, vascular, often giving rise to troublesome bleeding, and prone to undergo cancerous degeneration. The fibrous polypus may acquire a considerable size, and is generally pear-shaped, though sometimes of very strange forms; it is lobulated, smooth, and firm, except when subsequently softened and ulcerated; itself insensible, it may cause pain by pressure on surrounding parts; when softened or gangrenous, it may lead to bleeding or to offensive discharges equally exhausting. The fleshy polypus is vascular, painful, and prone to degeneration; the cartilaginous forms may undergo more or less osseous transformation. Polypus is generally a product of inflammation, sometimes of hypertrophy of the mucous membrane, and at others a fibrinous concretion which has become organized; to the first class belong the fleshy forms, to the 2d the mucous, and to the 3d the fibrous. According to their situation they impede the functions of organs; impairing smell and taste when in the nasal cavities, in the pharynx interfering with swallowing, in the auditory meatus with hearing, in the larynx with the respiration and the voice, in the rectum with defecation, in the bladder with the excretion of urine, and in the uterus with reproduction. The treatment consists of local applications for drying up or destroying the growth; or of excision, tearing off, laceration, seton, compression, ligature, and similar applications of modern surgery. In the nose the common form of the polypus is the gelatinous, and its favorite attachment the turbinated bones; its presence is indicated by a constant stuffed feeling as from a cold in the head, increased in damp weather; it may generally be brought into view by forcing air through the affected nostril, while the other is closed; there are sometimes more than one, and they are very liable to return when removed; if allowed to remain, the increasing size blocks up the nostril and displaces the septum, producing often great deformity on the cheek and about the eye; it is generally twisted off from its narrow peduncle by forceps. The hydatid, cancerous, and fungoid polypi admit only of palliative treatment. Uterine polypus is generally pear-shaped and attached by a narrow neck; the symptoms are those of uterine irritation, such as dragging pains, menorrhagia, and finally fetid discharges; it is generally removed by ligature. In other polypi near the external openings of the body the principles of treatment are the same; in the internal forms the diagnosis is obscure, and the treatment simply palliative.

POLYXENA, daughter of Priam and Hecuba, and beloved by Achilles. One legend relates that Achilles, for the sake of obtaining her in marriage, promised Priam to make peace between the Greeks and Trojans, and, going to the temple of the Thymbræan Apollo to conclude the negotiations, was treacherously slain by Paris. Polyxena was therefore sacrificed to his manes, according to one account on his tomb, according to another on the coast of Thrace. Another form of the legend represents Polyxena and Achilles to have fallen in love when the dead body of Hector was given up, and that when the Greek champion was slain she killed herself upon his tomb.

POMBAL, DOM SEBASTIÃO JOSÉ DE CARVALHO, marquis of, a Portuguese statesman, born in Soura, near Coimbra, in 1699, died in Pombal, May 8, 1782. He belonged to an old family of the lesser nobility, studied law at Coimbra, and entered the army, which he abandoned after a short period. Banished from Lisbon on account of quarrels, he spent several years in study at Soura. While there he gained the favor of a rich widow, Dona Teresa da Noronha-Almada, with whom, as her relatives bitterly opposed the match, he eloped. His wife's family treated him with contempt; and stung by their conduct he went to court, and through the influence of his uncle, Paulo Carvalho, was sent to England as secretary of legation. In 1745 he was recalled, but being a favorite with the queen was despatched to

Vienna to settle the dispute between the pope and the empress Maria Theresa in regard to the suppression of the archbishopric of Aquileia. There he gained general favor, and, as his first wife was dead, married the countess Daun, niece of the general of the same name. On his return he found his prospects improved by the affection with which the queen, who was an Austrian princess, regarded his wife; but the animosity of the high nobility was still sufficient to hinder his advancement. Concealing his real feelings, he gained the favor of the Jesuits, and on the death of John V. in 1750, and the accession of Joseph I., he obtained through the agency of the queen mother the position of foreign secretary. His energy, decision, and administrative talent soon gained him a complete control over the mind of the weak monarch. The kingdom at that time was in a miserable condition, without an army or navy, commerce or agriculture. He limited the power of the church and the inquisition, resumed the crown lands and checked abuses in the colonies, and expelled the Jesuits from their missions in Paraguay. He was everywhere met with the most bitter resistance, but his genius and perseverance overcame all opposition. The great earthquake of Nov. 1, 1755, which buried many thousand persons and destroyed an immense amount of property, gave him ample opportunity to display his ability in the restoration of order and the relief of distress. He was subsequently created count of Oeyras, and made prime minister. He now prosecuted his plans with the utmost rigor, removing and crushing all who obstructed them. His monopolies excited the wrath of the country people and of foreigners, especially of the English, who had hitherto held almost all the commerce of Portugal in their own hands. The vine dressers who were unwilling to plant corn saw their vineyards torn up by the roots. The ruffians who had been in the habit of plundering and assassinating in the very streets were shot down without hesitation. The Jesuits were removed from the person of the king, and on Sept. 16, 1757, they were ordered to retire to their colleges. Several of the Portuguese nobility were exiled from Lisbon. An attempt to assassinate the king on the night of Sept. 3, 1758, far from deterring Pombal from his purposes, gave him renewed power by placing in his hands the lives of his enemies. Three months afterward a number of the nobility were suddenly arrested. The duke of Aveiro and the marquis of Tavora, who were the principals in the conspiracy, were broken on the wheel, and others of their accomplices were put to death. The Jesuits were accused of being in the plot; some of them were executed in prison, and by a royal decree of Sept. 3, 1759, the whole body was banished from the kingdom. They refused to quit the country, whereupon they were seized to the number of 1,854, and transported to the Papal States. A quarrel now began with the pope in consequence of these proceedings, and Pombal expelled the papal nuncio, and made preparation to break with the church. The accession to the pontifical throne of Clement XIV., who in 1773 abolished the order, prevented any collision with Rome. Two short wars with Spain followed, in which the Portuguese army was organized on a new basis, and the frontiers were put in a better state of defence. A general system of education was devised, the study of physical and mathematical sciences was introduced, new kinds of crops were cultivated, navigation and ship building were taught, and the censorship was made less strict. The power of the minister was almost despotic, and while he used it for the elevation of his countrymen, he also used it mercilessly to take vengeance on his enemies, by whom his life was several times attempted. On the death of Joseph I. in 1777 he was dismissed by Pedro III., the state prisoners imprisoned by his order were set free, and his projects and regulations were given up. Portugal soon sank into a condition as weak and distracted as before, though Pombal handed over a well organized government with ample revenues. His enemies clamored for his life, but, attacked on all sides, he did not lose his defiant spirit. Though hated and assailed, the queen protected him, and he retired in safety to the village of Pombal, where he spent the remainder of his days in retirement.

POMEGRANATE (*punica granatum*, Linn.), a fruit native in the East and celebrated from a very remote period. The pomegranate tree has an arborescent stem with angular branchlets becoming spiny; deciduous, opposite, rarely whorled or alternate, oblong lanceolate, entire leaves; scarlet flowers 2 to 5 together, terminal upon the smaller twigs and nearly sessile; calyx with a top-shaped tube, its limb with 5 to 7 lobes and the æstivation valvate; petals 5 to 7; stamens numerous with distinct filaments bearing anthers on the inner side; style 1; stigma 1; fruit spherical, indehiscent, crowned by the upper portion of the calyx, divided into 2 portions by a horizontal diaphragm, the upper consisting of 5 to 9 cells, and the lower of 3 cells; seeds very numerous, surrounded by a transparent pulp; embryo oblong; radicle short, straight, its cotyledons leafy and spirally convolute. It belongs, as Lindley has shown, to the natural order *myrtaceæ* (see MYRTLE), though separated by Don into a distinct order termed *granateæ*, principally on account of a peculiarity in the fruit, which cannot be considered as strictly typical.—The pomegranate tree is usually a thorny bush, though it has been known to grow in a wild condition to the height of 18 to 20 feet. The dwarf pomegranate (*P. nana*, Linn.), with a shrubby stem 3 to 4 feet high, linear leaves, and red flowers, is a native of the Caribbee islands and of South America about Demerara, yet probably, as Persoon suggests, is only a variety of the common pomegranate. There are however 5 distinct varieties of the pome granate, viz.: the red-flowered, with the pulp of the fruit of a reddish color; the double red-flowered, commonly cultivated in gardens for its beauty, and there in pots and tubs on account of its tenderness; the whitish-flowered, with white petals and yellowish calyx, the pulp of the fruit of a pale red color; the double whitish-flowered, which is the tenderest of all; and the yellow-flowered, which is rarely seen. The second kind named is a charming shrub, and worthy attention among floriculturists. London speaks of one, trained against the walls of Fulham palace, which grew 40 feet high and 50 feet wide. The single pomegranate will grow in almost any soil, but the double-flowered variety requires a very rich one. It can be propagated readily from the fresh seeds, from pieces of the root, layers or cuttings, or by grafting upon the single kind. The bush needs much pruning and clipping. In the south of Europe the pomegranate tree is cultivated for its fruit and for an ornamental tree, and used as a hedge plant. The pulp of the fruit is acid, sometimes sweet, sometimes vinous, astringent, and refreshing. In most parts of Persia the fruit is delicious, and in the gardens under the snowy hills near the Cabool river there are famous varieties without seeds. A sirup prepared from the pulp is employed as a detergent and astringent. The rind of the fruit has been used instead of galls in making ink, and in Germany for dyeing leather in imitation of morocco. In India the bark of the root is employed in expulsion of the tapeworm, and the same use of it is known among the negroes of the West Indies.—The pomegranate was well known to the ancients, as is clear from numerous allusions in their writings. It was in high repute among the Hebrews, and employed by them in architectural ornament. The city of Granada is supposed to have derived its name from the numerous pomegranate trees planted near it, which is corroborated by its bearing a split pomegranate in its coat of arms.

POMERANIA (Ger. *Pommern*, from *po more*, Slavic words signifying "beside the sea"), a duchy now belonging to Prussia, bounded N. by the Baltic sea, E. by West Prussia, S. by Brandenburg, and W. by Mecklenburg; area, 12,153 sq. m.; pop. in 1858, 1,328,381, nearly all Lutherans except about 12,000 Roman Catholics and 12,000 Jews. It is divided by the river Oder into Hither Pomerania (*Vorpommern*) and Further Pomerania (*Hinterpommern*). Along with a part of the old Neumark and a few places in West Prussia, Pomerania now constitutes the province of the same name, which is divided into the three districts of Stralsund on the W., Stettin in the centre, and Köslin on the E., and also into 26 circles. There are 72 towns, of which the most important are Stralsund, Stettin, Kolberg, Köslin, Greifswalde, Stargard, and Kammin. The largest river is the Oder, which forms below Stettin the lake of Damm, then flows into the Frisches-Haff, and from thence into the Baltic by 3 channels, called the Peene, the Swine, and the Dievenow. Other principal rivers are the Persante, Rega, and Ihna. There are numerous lakes, of which the principal are those of Kummerow, Plöne, and Madüe. On the N. coast lie the 3 islands of Rügen, Usedom, and Wollin. The face of the country is generally level, the province being one of the flattest in Germany. The coast, which is low, is protected by sandhills and dikes, which are often changed about by the winds. The soil is mostly sandy, and generally of moderate fertility, portions being stony and sterile, while some parts are very fertile. The province is poor in minerals; bog ore, alum, salt, amber, chalk, marl, and peat are produced. The inhabitants are German, and in the N. E. portion are Kassubs, descendants of the Slavic Wends, who still preserve their own language. Linen is manufactured, and also cloth, serge, and other woollen fabrics. The trade of the province is important, of which Stettin with its port of Swinemünde is the chief seat.—Pomerania was formerly a principal portion of the old Wendish monarchy, but from 1062 had a line of dukes of its own, which terminated with the death of Bogislas XIV. in 1637. It was frequently overrun by the early Polish monarchs. Christianity was introduced in the 12th century, the first Pomeranian convert having been baptized on June 15, 1124, by Bishop Otho of Bamberg. After the dying out of the line of Pomeranian dukes, the electoral house of Brandenburg had a claim to the whole country by right of former treaties; but as during the 30 years' war the province had come into the possession of Sweden, the house of Brandenburg was forced to content itself with Further Pomerania. At the peace of Stockholm in 1720 Sweden gave up to Prussia the greater portion of Hither Pomerania, along with the islands of Wollin and Usedom, but continued to hold the district between Mecklenburg, the Baltic, and the river Peene, with the island of Rügen. This the former power ceded to Denmark as a compensation for Norway; and by the convention of June 4, 1815, it was given up to Prussia in exchange for the duchy of Lauenburg and the sum of 2,600,000 thalers.

POMERANUS. See Bugenhagen.

POMFRET, John, an English poet, born in Luton, Bedfordshire, in 1667, died in 1703. He was graduated at Queen's college, Cambridge, in 1684, took orders, and in 1699 published a collection of occasional poems and some Pindaric odes imitated from Cowley. His principal poem, "The Choice," describing a life of retirement and moderate wealth, was once reckoned the most popular poem in the English language.

POMMER. See Bugenhagen.

POMPADOUR, Jeanne Antoinette Poisson, marchioness de, mistress of Louis XV., born in 1721, died in 1764. She was the natural daughter of a butcher who had been obliged to flee on account of some dishonest transactions. *Her* mother gave her a good education, and married her in 1741 to a farmer of the taxes named Le Normand d'Étioles, shortly after which she first attracted the attention of the king while with a royal hunting party in the forest of Senart. It was not however until after the death of Mme. de Châteauroux (1744) that she became openly the king's favorite. She accompanied Louis during the campaign of Fontenoy in May, 1745, and on her return was presented at court by the title of marchioness de Pompadour. At first she meddled but little in political affairs. She patronized learning and the arts, embellished Paris, and with the assistance of Voltaire and Bernis organized brilliant fêtes, trusting for influence to her personal charms and her power of amusing the king. Even after she had lost to a great degree her hold upon his affections, she retained her power by making herself necessary to his comfort. She soon undertook to save him from the fatigues of government. She interfered with the finances, made and unmade ministers, and favored by turns the Jansenists, the Quietists, the infidels, and the parliament, that she might have the support of all parties. Flattered by Maria Theresa, who sent her an autograph letter, and irritated by the sarcasms of Frederic II. on the *dynastie des cotillons*, she brought about the alliance of France and Austria against Prussia which resulted in the disastrous 7 years' war. In 1757, after the attempt of Damiens to assassinate the king, she was obliged to quit the court; but being recalled soon afterward, she caused the ministers D'Argenson and Machault, who had advised her dismissal, to be disgraced. Her influence upon military appointments was one of the chief causes of the ill success of the war. She recalled Marshal d'Estrées after the French victory of Hastenbeck, and prevented the recall of Soubise after the defeat of the allies at Rossbach. She dismissed the minister Bernis, who advised peace, and replaced him by Choiseul. But in Choiseul, to her dismay, she soon found a master. He assisted her indeed to procure the suppression of the Jesuits, but it soon became apparent that his power depended no longer on her favor. She died hated by the nation and little regretted by the king. Beside an annual income of nearly 1,500,000 livres, she had received the territories of La Celle, Crécy, and St. Remy; the châteaux of Aulnay, Brimborion, and Bellevue; and splendid establishments at Paris, Versailles, Fontainebleau, and Compiègne. She made a generous use of her wealth, gave freely to the poor, patronized inventors, artists, and men of letters, and made magnificent collections of works of art and curiosities. She drew and engraved with considerable skill. The *Mémoires* and *Lettres* published under her name are not authentic.

POMPEII, an ancient city of S. Italy, situated about 14 m. S. E. of Naples, and directly at the foot of Mt. Vesuvius. It is of remote origin, having been founded probably by the Oscans, and subsequently occupied by the Etruscans, Pelasgians, and Samnites, but is not mentioned in history previous to the conquest of Campania by the Romans in the 4th century B. C. The name has no connection with that of the Roman *gens Pompeia*, but is supposed to have been derived from the word *πομπεία*, a triumphal procession, from the tradition that Hercules celebrated the foundation of the city with pomp. During the social or Marsic war the inhabitants joined in the insurrection; but the city was spared by Sylla, who contented himself with dismantling its fortifications, and planting a military colony in the neighborhood. Soon afterward it became a favorite summer resort of Romans of wealth and rank, and is mentioned as such by Seneca and Tacitus, the former of whom calls it a "celebrated city." Cicero had a considerable villa there, in which he sought relief from the midsummer heats of Rome, and where he entertained Augustus and other distinguished guests. In A. D. 59, in consequence of a sanguinary affray in the amphitheatre with the neighboring people of Nuceria, the inhabitants were prohibited by the emperor Nero from exhibiting any gladiatorial or theatrical shows within the city for 10 years. Four years later Pompeii was visited by two earthquakes, occurring at an interval of a few months, by which many public buildings were thrown down and an immense amount of damage done; and it had not entirely recovered from the effects of these disasters when it was overwhelmed by the famous eruption of Vesuvius, Aug. 24, 79, which involved it and the neighboring towns of Herculaneum and Stabiæ in a common destruction. (See HERCULANEUM.) Thenceforward for nearly 17 centuries the city disappears from history, although the name seems never to have been wholly lost. A village constructed from its ruins subsequently arose upon the site; but after the destruction of this by the eruption of 472, the Campus Pompeius, as it was long called, remained until the middle of the last century an undisturbed and uninhabited plain. As if to baffle more completely the researches of archæologists, the eruption of 79 produced striking physical changes in the vicinity, and the sea, which formerly laved the walls of the city, is now upward of a mile from its site, while the neighboring river Sarno has been considerably diverted from its ancient course. Hence the geographer Cluverius, who investigated the subject in the early part of the 17th century, following the descriptions of ancient authors, was induced to locate Pompeii at a distance of several miles from its actual position. A few years previous the architect Domenico Fontana had carried an aqueduct over a large portion of the buried city, without having his attention aroused by the remains of temples and public buildings which must have been constantly encountered. In this instance the oversight is somewhat remarkable, as the superincumbent deposit of ashes and cinders had an average depth of not more than 15 feet, and a portion of the great theatre was still visible. For nearly a century and a half longer Pompeii remained undisturbed, and it was not until the exhumation in 1748 of several statues and other objects of antiquity in sinking a well that public attention, already awakened by the partial excavation of Herculaneum, was drawn to the subject. Charles III. of Naples ordered excavations to be prosecuted on an extensive scale, and in 1755 the amphitheatre was uncovered. His successors have continued the work from time to time with more or less activity, until, after the lapse of nearly 18 centuries from the date of its destruction, about a fourth part of Pompeii has been brought to light. The city thus partially exhumed, though probably at its most prosperous period never ranking above a second rate provincial town, is of incalculable importance from the insight which it has afforded into the domestic economy, the arts, and the social life of the ancient world. The light and friable character of the volcanic deposits which overlaid it has fortunately preserved from decay the objects of most importance to modern archæologists, and the interiors of private and public buildings have been found undisturbed save by the original owners, who in many instances returned after the eruption had subsided to search for such articles of value as could be easily removed, and also probably for the bodies of relatives or friends who were unable to escape. The latter supposition would seem to be proved by the fact that comparatively few skeletons have been discovered, whereas, according to Dion Cassius, the loss of life was considerable, notwithstanding the inhabitants were assembled in the amphitheatre at the time of the catastrophe, and could readily make their escape. As it is pretty well settled that successive eruptions have contributed to the deposit which now covers the city, such original excavations must have been comparatively easy.—Pompeii occupied within its walls, which have been traced throughout their whole extent, an irregular oval area about two miles in circumference. On the W. or sea side there are no traces of walls, and those remaining, though originally of great strength, being flanked at irregular intervals by massive square towers, appear to have been allowed to fall into decay many years before the destruction of the city. The workmanship of these indicates the Osco-Pelasgic origin of the city. Eight gates have been discovered leading to Herculaneum, Capua, and other places, that to Herculaneum being the most important and ornamental. The streets, which for the most part run in regular lines, crossing each other nearly rectangularly, are with some exceptions barely wide enough to admit the passage of a single vehicle, and everywhere the ruts of the chariot wheels are visible in the polygonal lava blocks which form the pavement. The widest does not exceed 30 feet in breadth, few are over 22 feet, and that leading from the gate of Herculaneum to the forum, and which must have been one of the chief thoroughfares of the city, has an average width of from 12 to 14 feet only, including the raised footpath on either side. In addition to the last named, 4 other main streets have been partially or wholly traced, with which a regular system of minor streets appears to have been connected. These thoroughfares, with a single exception, terminate in or traverse the westerly quarter of the city, which is the only part yet completely explored, and which, from the number and character of the public buildings found there, was undoubtedly the most important. The forum, situated in the S.W. corner, is the most spacious and imposing structure in Pompeii, and in its immediate vicinity are the chief temples, theatres, and other public buildings. It was enclosed on 3 sides by a Doric colonnade, which embraced an area 160 yards in length by 35 in breadth, and in its general plan as well as in its surroundings resembled the usual Roman structures of the kind. Of the buildings adjoining it, that known as the temple of Jupiter on the N. side is supposed to have been the most magnificent in the city, and its portico of Corinthian columns is perhaps the finest yet exhumed. On the E. side stood the pantheon or temple of Augustus, as it has been called; the Curia or Senaculum; the temple of Mercury; and a spacious house, called the Chalcidicum, which, as appears from an inscription, was erected by the priestess Eumachia. On the S. are 3 buildings supposed to have been courts of justice, and on the W. a basilica, a large temple profusely decorated with painting and commonly called the temple of Venus, and the public granaries and prisons. All of these afford striking evidences of the disastrous effects of the earthquakes of 63 and 64. The architecture, moreover, like that of most public and private edifices in Pompeii, is of a mixed character, the style, whether Greek or Roman, being frequently defective, and the attempts to unite different orders clumsy and tasteless. Other public buildings were the temples of Fortune, of Isis, of Neptune or Hercules, and of Æsculapius, the names of the two last being conjectural. That of Neptune is of pure Doric architecture, not unlike the temple of the same name in Pæstum, and is the oldest structure of the kind in Pompeii. S. E. of the forum, and at a distance of 400 yards, were the great or tragic theatre, and the lesser theatre or Odeum, both of Roman origin. The former, having accommodations for about 5,000 people, stood on a slight elevation, and was never completely buried by the ashes. In the S. E. angle of the city was the amphitheatre, an ellipse 430 feet by 335, capable of seating 10,000 spectators, which was about half the population of the city; and immediately N. of the forum were the *thermæ* or public baths, in an elegantly adorned and well arranged structure. A long quadrangular building S. of and adjoining the great theatre is supposed to have been the barracks of troops or of gladiators. Numerous implements of war have been discovered there, and in and about the building were 64 skeletons, probably of men forming the guard, who remained at their posts unmoved by the catastrophe; "a remarkable and affecting proof," it has been observed, "of the discipline of the Roman soldier." The domestic architecture of Pompeii is in keeping with that of its public buildings, a mingling of the Greek and Roman methods with respect to external features and internal arrangements, although in plan the houses are more Roman than Greek. They are for the most part small and low, few exceeding two stories in height, have little external ornamentation, and are well adapted to a people accustomed like the Pompeians to pass most of the day in the open air. The ground fronts of many of the finest are occupied by shops, the rents derived from which formed an important source of revenue to the inhabitants. The upper stories of private dwellings, being of wood with flat roofs, were speedily consumed by the heated ashes of the eruption; but as these portions of the house were generally used as store rooms or apartments for servants, their loss is of little consequence. The lower or ground apartments, in which the family proper lived, have fortunately escaped serious injury, and in many of these the daily life, habits, tastes, and even the thoughts of the occupants can be traced with almost positive certainty. Of the houses of the better description, the names applied to which are either those of the supposed possessor, or are suggested by his occupation, or by prominent objects of art found in them, the most important are the house of Sallust, one of the largest and most complete in its arrangement and adornment in the city; that of Pansa; that of the tragic poet, less distinguished for its size than for the variety and beauty of its paintings, most of which have been removed to the Museo Borbonico in Naples, and for the well known mosaic of the choragus instructing the actors; that of Meleager or the Nereids; that of Castor and Pollux, unsurpassed in magnificence and size, and equally ornamented within and without; that of the faun, or of the great mosaic, so called from the bronze figure of the dancing faun and the famous mosaic of the battle of Issus found there, and which contains the most beautiful mosaics yet discovered in Pompeii; and that of M. Lucretius, one of the latest yet uncovered, and rich in pictures, mosaics, vases, bronzes, ornaments, and coins. Outside of the gate of Herculaneum are the remains of two extensive suburban villas, called with little reason the villas of Diomedes and of Cicero, the latter of which, after the removal of its treasures toward the end of the last century, was again filled up with earth. The approach to the gate of Herculaneum, which passes in front of these structures, is lined on either side with tombs of considerable size and architectural pretension. Several of the houses above mentioned were evidently entered by their owners immediately after the subsidence of the first eruption, in search of valuables; and the most important paintings and objects of art discovered by excavation have been deposited in the Museo Borbonico. (See NAPLES.) As no buildings indicating poverty in the occupants have been discovered, it is doubtful whether Pompeii had any pauper population, or whether they inhabited a quarter of the city not yet excavated. Of late years the excavations have proceeded slowly, the annual amount appropriated by the late Bourbon government having barely sufficed for repairs and various incidental expenses; but under the government inaugurated in 1860 the work, it is said, is to be prosecuted with increased energy.—Detailed accounts of the results of the explorations in Pompeii will be found in Mazois' work, continued by Gau, *Les ruines de Pompéi* (4 vols. fol., Paris, 1812–'38); in Sir W. Gell's "Pompeiana" (1st series, 2 vols. 8vo., London, 1824; 2d series, 2 vols. 8vo., 1830); and in Breton's *Pompeia* (8vo., Paris, 1855). The most recent work on the subject is that of Overbeck (8vo., part i., Leipsic, 1856).

POMPEY. I. CNEIUS POMPEIUS MAGNUS, a Roman general and triumvir, born Sept. 30, 106 B. C., assassinated in Egypt, Sept. 29, 48. He was the son of Cneius Pompeius Strabo, a general of some repute and consul in 89, and first saw military service in the social or Marsic war, in which he fought under his father. During the struggle between Marius and Sylla, he sided with the latter, and in 87 aided in the defence of Rome against Cinna and Sertorius, the partisans of Marius. The triumph of Marius compelled him to remain for some time in obscurity; but when Sylla, after finishing the Mithridatic war, took up his march for Italy, Pompey, eager to ingratiate himself with the chief of his party, raised on his own responsibility 3 legions, with which he defeated the Marian general M. Brutus and effected a junction with Sylla. During the war which prostrated the Marian party in the Italian peninsula, he gained great distinction as one of Sylla's legates, and was rewarded with the hand of Æmilia, the step-daughter of Sylla. He next reduced Sicily, and in 81, crossing over to Africa, he overran Numidia, where the Marian party still held out against Sylla, and completely crushed them in a battle, in which their general Cn. Domitius Ahenobarbus and 17,000 Numidians were slain. Upon returning to Rome he was met by the populace with acclamations, and the dictator bestowed upon him the surname of Magnus, which was thenceforth borne by himself and his descendants. Not content with this distinction, he claimed a triumph, a thing unheard of for a man of equestrian rank who had filled no office of state, and which encountered the opposition of Sylla. The latter, however, in view of the fact that Pompey's army was encamped outside of the city, finally yielded; and the young general, who had not yet completed his 25th year, entered Rome in triumph in Sept. 81. Two years later Pompey again thwarted the wishes of Sylla by securing the election of M. Æmilius Lepidus to the consulship; but, true to the aristocratic party to which he had attached himself, he refused to aid the consul in repealing the constitution of Sylla, and when Lepidus in 77 marched upon Rome at the head of an army, he joined Catulus in defeating him. In the succeeding year he was sent by the senate to coöperate with Metellus Pius in the reduction of Spain, where Sertorius, the last and ablest general of the Marian party, continued to hold out against the aristocracy. Here he met an enemy with abilities equal if not superior to his own, as was evinced in their first encounter, which resulted in the defeat of Pompey. In an obstinate battle fought in the next campaign he was again worsted by his opponent, narrowly escaping with his life; and on another occasion he was routed by him, with the loss of 6,000 men. He received reënforcements from the senate, and for several years an uncertain struggle was maintained. But Sertorius having been assassinated by his rival Perperna, Pompey found little difficulty in bringing the war to a successful termination, and in 71 he returned with his army to Rome. Passing through northern Italy, he cut to pieces a body of 6,000 gladiators, who had escaped from the battle in which their leader Spartacus was overthrown by Crassus, and thus claimed the merit of finishing the servile war also. So popular was he now with the soldiery and the people that his demand for a triumph was willingly granted, while Crassus, who had in reality crushed the formidable revolt of Spartacus, received only an ovation. In the following year Pompey and Crassus entered upon the consulship, notwithstanding both were excluded by the laws of Sylla; and the former increased his popularity by restoring the tribunitian power, and instituting a reform of the judicial system. These measures however involved the severance of his former party ties, and thenceforth for many years he was the avowed enemy of the aristocracy. For two years after the expiration of his consulship he kept aloof from civil affairs, for which in fact he had little capacity; and in 67, after an obstinate resistance by the aristocracy, which at one time threatened to end in a civil war, he was appointed with unlimited and irresponsible power for 3 years commander-in-chief of an immense naval force destined to exterminate the pirates who infested the Mediterranean. He speedily cleared the sea west of Greece of the enemy, and sailing to the eastward annihilated their entire force in a great battle off Coracesium, on the coast of Cilicia. In the course of 3 months the war was completed, and the victorious commander, during his absence from Rome in 66, was on motion of the tribune C. Manilius invested by acclamation with the command of the war against Mithridates, a measure advocated by Cicero in his oration *Pro Lege Manilia*, and by Pompey's rival in after times, Caius Julius Cæsar. This commission was accompanied with a grant of unlimited control over the land and naval forces in the East, and with proconsular power in the whole of Asia as far as Armenia; so that Pompey now wielded the most extensive authority hitherto conferred by law upon a Roman citizen, with the exception of Sylla. The aristocratic party naturally looked upon him with more jealousy and distrust than ever, while in the estimation of the people he was the foremost man in Rome. In the summer of 66 he assumed the command of the army of the East, and pushing forward with rapidity surprised and totally defeated Mithridates in Lesser Armenia. For the next 4 years his career was one of uninterrupted success. All eastern Asia Minor was subjected to the Roman sway, and Armenia, the southern Caucasus, Mesopotamia, Media, Syria, Phœnicia, and Judæa were either made tributaries to the republic or were reduced to the condition of conquered provinces. In 63 Mithridates, a fugitive in the Tauric Chersonesus, after vain endeavors to unite the barbarous tribes of eastern Europe against Rome, put an end to his life; and Pompey, who had taken Jerusalem and was meditating new conquests in the remote East, led back his troops to the Euxine, and at Sinope honored the remains of his adversary with a royal funeral. Early in 62 he left Asia, and proceeding by slow marches reached Rome at the end of a twelvemonth, bringing with him an immense train of royal and noble captives, and an almost fabulous amount of eastern spoils. His third triumph, lasting two days, was celebrated in Sept. 61, and from that date is to be traced the decline of his fortunes. Almost immediately afterward he met with a rebuff from the senate, who, glad of an opportunity to affront a man of his importance and influence with the people, refused to ratify his measures in Asia, and to make an assignment of the lands he had promised to his veterans. This only widened the breach between Pompey and the aristocracy, and hastened the downfall of both. In this emergency Pompey found a friend in Cæsar, whose influence with the people had been steadily growing during the absence of the former in the East, and who was now plotting with consummate tact to supplant him in power. They mutually agreed to support each other in their prominent public measures; and at the instance of Cæsar, Crassus, a man formidable from his great wealth and aristocratic connections, was induced to join the coalition, which is known in history as the first triumvirate. In the succeeding year, 59, Cæsar entered upon his first consulship, and secured for Pompey the ratification of his acts in Asia, and also by his agrarian law enabled him to make good his promises to his soldiers. At the same time, to cement eir union more closely, he gave him his aughter Julia in marriage. Pompey now sur- endered himself to the pleasures of domestic fe, with little care for the machinations of is enemies, or regard for the welfare of his iends. Cicero, his panegyrist, was allowed go into exile; and only when his own life as threatened by the enemies of the orator d Pompey make an effort to procure his re- ll. In gratitude for this act Cicero pro- red for Pompey the office of *præfectus an-* næ for 5 years, with proconsular authority d the command of 15 legions. Notwith- anding he was enabled to cheapen the price f corn in Rome, he found that his influence as waning at home, and that he had grad- ally lost the confidence of all parties. Exas- erated by the attacks of Clodius, Cato, and hers of his enemies, who, he charged, were ting at the instigation of Crassus, he repaired 56 to Cæsar's winter quarters at Lucca, here he was reconciled to Crassus, and the iumvirate was ratified anew, the agreement be- g that Pompey and Crassus should be consuls uring the ensuing year and obtain provinces d armies, while Cæsar was to have his gov- rnment of Gaul continued for 5 years. Ac- ordingly, in 55, after some opposition, Pom- y and his colleague were inducted into office, d the former, pleased with the idea of se- uring the dictatorship, endeavored to regain e popular favor by an exhibition of gladia- rial shows and combats of wild beasts in a rge theatre he had constructed in the Cam- us Martius. The people were amused for e moment, but soon began to express their scontent that Pompey should send his le- tes to Spain, the government of which prov- ce he had secured, instead of conducting the ar there personally. At the same time it ecame apparent that Cæsar was gaining so apidly in influence with the people that a truggle between him and his rival must ensue. or two years after the expiration of his con- lship Pompey remained at home, and by ecretly abetting intestine feuds promoted a ate of anarchy in Rome, which compelled the nate to invoke his assistance. He was in- ested with supreme authority by being made le consul in Feb. 52, and soon restored com- rative order in the city. This may be con- dered his final rupture with the people and s reconciliation with the aristocracy, of whom e now became the acknowledged head. Va- ous measures were at once brought forward check the designs of Cæsar, whose influence ith the people by a lavish expenditure of oney was steadily increasing; and upon his nnouncing his intention to stand for the con- lship for the year 48, Pompey and the aris- cracy demanded that he should present him- lf in Rome as a candidate for the office. æsar naturally declined to place himself in e power of his enemies, but agreed to resign s office and command if Pompey would do e same. As this proposition was unpalatable to the senate, a decree was passed in Jan. 49, by which Cæsar was required to disband his army before a specified time, under penalty of being declared an enemy to the republic. Cæsar, accepting the challenge thus thrown down to him, immediately crossed the Rubicon and marched upon Rome. Pompey, infatuated by the possession of power, and confident of his capacity to raise any number of troops the exigencies of the state might demand, had taken no measures to provide against this movement; and when Cæsar with his veteran legions, trained in the wars of Gaul, was at the city gates, he found himself utterly unable to offer resistance, and with the consuls and the greater part of the senate and aristocracy fled to Brundusium. Being vigorously followed by his enemy, he crossed over to Greece, and at Dyrrachium, on the coast of Illyricum, assembled a numerous army, with which he awaited the approach of Cæsar. Early in 48 Cæsar arrived in Greece, with forces less numerous than those of his opponent, but greatly superior in discipline. He manœuvred in vain to draw Pompey from his position; the latter was bent upon weakening his enemy without risking a battle, and had he been allowed to follow out his plans might have escaped ruin. But the clamorous impatience of the Roman nobles and senators who filled his camp thwarted his purpose, and when Cæsar, after a severe check at Dyrrachium, was compelled through failure of supplies to direct his march into Thessaly, Pompey was urged against his better judgment to follow and give him battle on the plains of Pharsalus. His army was completely routed by Cæsar's veterans, and he himself, disheartened and bewildered by his defeat, fled with a few friends to Lesbos, whence he repaired to Pamphylia, where a number of his party with ships and troops joined him. Being advised to seek an asylum with the young king of Egypt, to whose father he had rendered signal services, he arrived off the coast of that country and disembarked in a small boat with a few attendants. The chief officers of the king, who were awaiting him on the shore, had determined, as a means of propitiating Cæsar, upon putting him to death; and as he was about to leave the boat Septimius, who had been one of his centurions and was now in the service of the king of Egypt, stabbed him in the back. The rest then drew their swords, and Pompey, seeing that resistance was hopeless, covered his face with his toga and was despatched upon the spot. His body was cast out naked on the shore, where it was buried by a freedman, and his head sent to Cæsar, who wept upon beholding it, and put his murderers to death. In private life Pompey was temperate and frugal, and was a kind and indulgent husband. It deserves to be mentioned to his credit that his immense wealth was honestly acquired, and that he was conscientious in the management of the public finances. He was married

5 times, his last wife, Cornelia, surviving him. II. Cneius, eldest son of the preceding by his 3d wife, Mucia, born between 80 and 75 B. C., killed in Lauron on the Spanish coast in 45. His first important military service was in the war between his father and Cæsar. After the battle of Pharsalia he was left in possession of a formidable fleet, and in 47 began to take active measures to renew the war. He collected an army of 13 legions in Spain, whither in the latter part of 46 Cæsar followed him. He was totally defeated in the desperate battle of Munda, March 17, 45, and shortly after was overtaken and killed at Lauron. He was naturally bold and passionate, and the death of his father aroused in him a ferocious implacability. III. Sextus, brother of the preceding, born in 75 B. C., killed at Miletus, Asia Minor, in 35. After the defeat of his brother at Munda he assembled a considerable force of fugitives and malcontents, with which he defeated Asinius Pollio, the Roman legate, and acquired possession of Bœtica and other portions of Spain. So formidable did he become, that it was proposed in the senate to make terms with him, and a vote was taken to allow him to return to Rome and to indemnify him for the confiscation of his father's possessions. The formation of the 2d triumvirate defeated this project, and Sextus, being now declared an outlaw, made a descent upon Sicily, which was speedily reduced to his sway. For several years he contented himself with harassing his enemies by cutting off their supplies of provisions from Sicily, and in 42 he defeated in the straits of Sicily a fleet sent against him by the triumvir Octavius. During the campaign of the triumvirs against Brutus and Cassius he remained inactive, but subsequently the vigilance of his fleet in intercepting the supplies of corn destined for Rome produced such a scarcity in the capital, that the populace rising in insurrection demanded that peace should be concluded with him. A treaty highly advantageous to Sextus was accordingly negotiated, but proved a mere delusion, none of the parties apparently being sincere in their professions. The war recommenced with signal advantages to Sextus, whose admirals in 38 twice defeated the fleets of Octavius; but again by his inactivity he let the moment for decisive action slip by, and quietly permitted his enemies to equip new armaments. In the summer of 36 three large fleets sailed from different points upon Sicily, but were so shattered by a storm that the attack proved abortive. With fatal infatuation Sextus again allowed Octavius to recover from this disaster, and in September of the same year the triumvir's fleet, commanded by M. Vipsanius Agrippa, completely defeated his own in a fight off Naulochus on the coast of Sicily. He fled with a few ships to Asia Minor, and, after vain endeavors to wrest the eastern provinces from Antony, was captured and put to death by the triumvir's legate, M. Titius.

POMPONIUS MELA. See Mela.

PONCE, Pedro, a Spanish Benedictine, born in Old Castile about 1530, died at the convent of Ona, in Old Castile, in 1584. He is believed to have been the first instructor of deaf mutes in articulation. Ambrosio Morales states that he taught two brothers and a sister of the constable of Castile, and a son of the grand justice of Aragon, who were deaf and dumb; and after some years they were not only able to write and read correctly, but to converse intelligently. One of them, who died in his 20th year, spoke and wrote Latin fluently. Another became a Benedictine, and, according to the testimony of Sir Kenelm Digby, conversed on religious and scientific subjects very freely, and without betraying his infirmity. Sir Kenelm's account of Ponce and his method of teaching is supposed to have been the means of calling the attention of Wallis and Holder, and perhaps also Dalgarno, to the education of deaf mutes. Ponce wrote a treatise in Spanish, now lost, in which he explained his methods, and laid down certain rules for the instruction of the deaf and dumb.

PONCE DE LEON, Juan, a Spanish discoverer, born in Leon, died in Cuba in 1521. He distinguished himself in several campaigns against the Moors of Granada, and, accompanying Columbus on his second expedition in 1493, became commander of the eastern province of Hispaniola. He made an expedition to Porto Rico in 1508, procured considerable gold, and on his return to Hispaniola obtained permission to raise money and men sufficient to subjugate the island; but before he set out he was removed and another commander appointed in his place. In 1509 he was reappointed, and finally reduced the island, which he governed with severity, till the family of Columbus again caused his removal. He was now an old man; but his love of adventure was still strong, and beside he had heard of the existence of a fountain which could restore youth and beauty; and confident of the reality of the fabled fountain, he fitted out 3 ships at his own expense, and on March 3, 1512, sailed from St. Germain in Porto Rico for the Bahamas, one of which group, called Bimini, was said to contain the marvellous fountain. Island after island was visited, the waters of every river, fountain, or lake were tasted, but no trace of Bimini or its wonderful stream could be found. Turning to the north-west, on Easter Sunday land was seen. It was thought to be an island, and from the magnificence of the vegetation and from the day of its discovery (Span. *Pascua florida*) it received the name of Florida. On April 8 he landed some miles N. of the present site of St. Augustine, and took possession of the country in the name of the king of Spain. He spent several months in cruising, doubled Cape Florida, sailed among the group called by him Tortugas, and finally returned to Porto Rico, leaving behind one of his followers to continue the search. In 1513 e arrival in Spain, where he was appointed overnor of Florida, on condition that he should olonize the country. The next year he re- eived the command of an expedition fitted out gainst the Caribbee Indians, which proved nsuccessful. Retiring to *Porto Rico*, it was ot until 1521 that, embarking nearly all his ealth in two ships, he proceeded to take pos- ession of his province. In Florida he was met y the natives with determined hostility, and n an attack made by them the Spaniards ere driven to their ships, and Ponce de Leon imself was mortally wounded, and died after is arrival in Cuba.

PONCE DE LEON, Luis, a Spanish lyric et, born in Granada in 1528, died in Madri- d, Aug. 23, 1591. He entered the Augus- tian order at the age of 16, became licen- iate in theology in 1560, and doctor of divin- y shortly afterward, and at the age of 34 btained a professorship of theology at Sala- anca. Ten years later he was made professor f sacred literature. For the benefit of some iends he made a version of the "Song of olomon" into Castilian; and the manuscript lling into the hands of his enemies, he was rought before the inquisition of Valladolid in 572, on a charge of Lutheranism, and of hav- g translated a part of the Scriptures into the ernacular without authority. After 5 years' prisonment he was reinstated in all his offices the university in Dec. 1576, beginning his first cture after so many years' intermission with e simple introduction: "As we remarked hen we last met." His original productions, hich stand at the head of Spanish lyrical etry, are few in number, and chiefly of a re- gious character. They were first published by s friend Quevedo in 1631. His most popular ose work was his *Perfecta casada*, or "Per- ct Wife," a treatise in the form of a commen- ry on portions of the book of Proverbs. mong his other prose works are the "Exposi- on of Job," and "The Names of Christ," nsisting of a series of eloquent discourses on e Saviour's character. He also translated e Eclogues and two of the Georgics of Virgil, out 30 odes of Horace, about 40 psalms, and ssages from the Greek and Italian poets. he best edition of his works is that of Madrid vols., 1804-'16). At the time of his death e had just been chosen head of his order, and as planning regulations for its reform.

POND, Enoch, D.D., an American clergy- an, born in Wrentham, Mass., July 29, 1791. e was graduated at Brown university in 1813, udied theology with Dr. Emmons of Franklin, as licensed to preach by the Mendon associ- tion in June, 1814, and was ordained pastor of e Congregational church in Ward (now Au- urn), Mass., March 1, 1815. He was dismissed 1828, to become the conductor of the "Spirit the Pilgrims," a monthly publication in the terest of orthodox Congregationalism then st established in Boston, and which bore an portant part in what is known as the "great Unitarian controversy." After editing 5 volumes of this work, writing himself more than half the articles published, he was called to the professorship of theology in the theological seminary at Bangor, Me., and inaugurated in Sept. 1832. He continued to discharge the duties of that position and of the department of ecclesiastical history until 1856, when he resigned the professorship of theology, to become "president, professor of ecclesiastical history, and lecturer on pastoral duties," which is the designation of his present relation to the institution. Dr. Pond's first publication, in 1817, was a review of a sermon against "Conference Meetings," by Dr. Bancroft of Worcester, Mass., which led to a reply and rejoinder. The same year he reviewed "Judson on Baptism," his review reaching two editions. In 1824 he published a volume of "Monthly Concert Lectures." Since that time he has published the following works: in 1827, a "Memoir of President Davies," and a "Memoir of Susanna Anthony;" in 1839, a "Memoir of Count Zinzendorf;" in 1841, a "Memoir of John Wickliffe;" in 1842, the "Morning of the Reformation;" in 1843, a "Review of Second Advent Publications," and "No Fellowship with Romanism;" in 1844, the "Mather Family," and "The Young Pastor's Guide;" in 1845, "The World's Salvation;" in 1846, "Pope and Pagan," a "Review of Swedenborgianism" (a new edition of which was issued by the American tract society, Boston, 1861), and "Plato;" in 1848, a "Life of Increase Mather and Sir William Phipps," and "The Church" (which reached a second edition in 1860); in 1849, a "Review of Bushnell's 'God in Christ';" in 1851, the "Ancient Church;" in 1856, a "Memoir of John Knox;" and in 1858, "The Wreck and the Rescue, a memoir of Rev. Harrison Fairfield." Dr. Pond has been an extensive contributor to the principal religious journals, and has written also many tracts and short articles for the weekly press.

POND, John, an English astronomer, born about 1767, died in 1836. He studied under Wales, astronomer to Capt. Cook's expedition, and at Trinity college, Cambridge. Settling at Westbury near Bristol, he made a series of observations from which he deduced that the quadrant then in use at Greenwich for the determination of declinations had changed its form since 1750, a result subsequently verified by measurement. In 1807 he removed to London, and in 1811 was appointed to succeed Dr. Maskelyne as astronomer royal. He subsequently devoted his attention chiefly to determining the places of the fixed stars. He invented the method of observing in groups, and was the first astronomer who advocated the now universal practice of depending upon masses of observations for all fundamental data. He retired upon a pension in 1835.

PONDICHERRY, a town on the Coromandel coast, and capital of the French possessions in Hindostan, 85 m. S. from Madras; pop. about

40,000. It is situated at the mouth of a small river accessible by vessels of light draught, and presents from the sea a rather imposing appearance. Previous to the war of 1756, during which it was destroyed by the English, it was one of the finest cities in India. The European quarter is well laid out along the sea shore, and is separated from the native town by a ditch crossed by several bridges. There are large bazaars, 2 churches, a lighthouse, several schools, and a college. The territory annexed to Pondicherry has an area of 107 sq. m. and a population (1856) of about 120,000. It is surrounded by the British province of South Arcot, and is not very fertile. There is no harbor, but vessels anchor on the open coast, where at all times a heavy sea rolls in, and the surf upon the shore is almost as dangerous as at Madras. The value of both imports and exports is not quite $1,000,000 per annum. The settlement was purchased by the French from the Bejapoor rajah in 1672. It was captured by the Dutch in 1693, but given up at the peace of Ryswick; and taken by the British in 1761, 1778, 1793, and 1803, but each time restored at the conclusion of hostilities. When last given up by the English, it was stipulated that no European soldiers should be landed at Pondicherry, and no fortifications constructed.

PONGO. See Orang-Outang.

PONIATOWSKI, the name of a Polish family of Italian origin. Joseph Salinguerra, a member of the Italian family of Torelli, settled in Poland, and there assumed the name of Poniatowski from the estate of Poniatow, belonging to his wife, who was the daughter of Albert Poniatowski and Anna Leszczynska. The following are the most distinguished of his descendants. I. Stanislaw, born in 1677, died in 1762. He attached himself to the fortunes of Stanislas Leszczynski and his protector Charles XII., accompanied the Swedish army to Russia, and was present at the battle of Pultowa (1709), after which he was sent as ambassador to Constantinople, and while there was skilful enough to involve the sultan in a war with Russia. After the death of Charles, he supported Augustus II., and by him was raised to several offices. Upon the death of Augustus he again joined the fortunes of Stanislas Leszczynski, was taken prisoner at Dantzic by the Russians, was afterward released, and was held in high honor by Augustus III. He wrote "Remarks of a Polish Nobleman on Voltaire's 'History of Charles XII.'" (the Hague, 1741). II. Stanislaw August, eldest son of the preceding, born in 1732, was elected king of Poland in 1764, and died in 1798. (See Poland.) III. Jozef Antoni, prince, and marshal of France, nephew of the preceding, born in Warsaw, May 7, 1762, drowned in the river Elster, Oct. 19, 1813. He entered the Austrian army, was in the campaign of 1787 against the Turks, and in 1789 was made a major-general in the Polish army. In the war against Russia in 1792 he commanded on the Bug, and when the king, his uncle, acceded to the confederation of Targovitza, Joseph left the service with most of the best officers; but when subsequently Kosciuszko raised the standard of revolt in 1794, he served under him as a volunteer, although in the campaign of 1792 Koscinszko had been below him in military rank. The command of a division was intrusted to him, with which he performed effective service during the two sieges of Warsaw, and after the capitulation of that city he went to Vienna. In 1798 he returned to Warsaw, then under the dominion of Prussia, lived upon his estates as a Prussian subject, and upon the occupation of that city by the French he joined their army, and during the campaign of 1807 commanded the Polish national army against the Russians. By the peace of Tilsit the duchy of Warsaw was created, and Poniatowski became its minister of war. In the war between Austria and France in 1809, he was compelled to evacuate the duchy, but invaded Galicia, and terminated the campaign by the occupation of Cracow. In the invasion of Russia in 1812 he commanded the Polish auxiliaries of the grand army. Just before the battle of Leipsic he was made by Napoleon a marshal of France. After that battle he was intrusted with the duty of covering the retreat of the French. The enemy had gained possession of the suburbs of the city, when with a small retinue he plunged into the deep stream of the Elster, in which he disappeared. His body was recovered 4 days after.

PONS, Louis, a French astronomer, born in Peyre, department of Hautes-Alpes, Dec. 24, 1761, died in Florence, Oct. 14, 1831. In 1789 he became connected with the observatory of Marseilles. He possessed such an uncommonly clear vision and excellent memory that a glance at a star enabled him to determine whether it belonged to the stars already catalogued or not. In 1819 he became superintendent of the observatory at Martia, in Lucca, and in 1825 of that of the museum at Florence. From 1801 to 1827 he had discovered 37 comets, and calculated the paths of many of them.

PONSARD, François, a French dramatist, born in Vienne, department of Isère, in 1814. He was sent to Paris in 1833 to study law, and in 1837 published a translation in verse of Byron's "Manfred." His first dramatic composition was the tragedy of *Lucrèce*. Rachel had refused to read it, and it had been declined by the committee of the Odeon theatre; but the manager of this theatre produced it. It had a great success, and received a prize from the academy. He subsequently produced other dramas with less success, and in 1852 fought a duel with Taxile Delord, a journalist, on account of some insinuations in reference to a public appointment. This affair was his inspiration in the comedy of *L'honneur et l'argent*, which, politely declined at the *théâtre Français*, was triumphantly produced at the Odeon. Ponsard was elected to the academy in 1855.

PONTCHARTRAIN, a salt water lake in the E. part of Louisiana, so called in honor of ount Pontchartrain, a minister of Louis XIV. he lake is about 40 m. in length from E. to ., by 24 in breadth from N. to S. It is conected with Lake Borgne on the E. by the igolets, a narrow winding strait, and with ake Maurepas on the W. by the bayou Manhac. Its S. shore approaches within 5 or 6 m. f New Orleans; and the bayou St. John, a mall tributary, extends into the suburbs of hat city. The lake is nowhere more than about 0 feet in depth, yet it is the medium through hich is carried on most of the coasting trade etween New Orleans and the eastern gulf orts. Steamboats and small vessels obtain ccess from the lake into the heart of the city y means of two canals, each terminating in an rtificial basin. The northern shores of the ake are more elevated than the southern, and fford sites for handsome country seats and laces of summer resort. Among these are the illages of Madisonville and Mandeville.

PONTE, DA. See BASSANO.

PONTE DELGADO, a town on the S. side f the island of St. Michael, one of the Azores, n lat. 37° 40′ N., long. 25° 36′ W.; pop. 22,000. t is tolerably well built and substantial, and is efended on the sea side by the castle of St. ras, and about 3 m. to the E. by the forts of an Pedro and Rosto de Cão. The harbor is shallow that vessels require to be loaded outide by means of lighters. Wheat, maize, and ranges are the chief exports.

PONTIAC, the capital of Oakland co., Mich., n Clinton river, and on the Detroit and Milwaukee railroad, 26 m. N. W. from the former; op. in 1860, 2,600. It has an active business, nd exports largely of wool, wheat, fruit, and utter. Beside the county buildings it contains number of manufactories, the river affording mple water power, 2 weekly newspaper offices, nd 7 churches.

PONTIAC, a North American Indian chief f the Ottawas, an Algonquin tribe, born about 712, killed in 1769. He was first known as n ally of the French. In 1746, at the head of body of Indians, mostly Ottawas, he successlly defended Detroit, then a French possesion, against the attacks of some hostile northrn tribes. He is believed to have led several undred Ottawas at Braddock's defeat in 1755; nd when an English detachment was sent nder Major Rogers in 1760 to take possession f the western posts that the French had reinquished by the treaty of Paris, it was met y Pontiac, who, though he claimed the terltory as his own, received the English commandant in a friendly spirit, and saw him safely o his destination at Detroit. The Indians at hat time were fond of the French, and hated he English; their discontent was increased by njudicious usage, and trivial conspiracies bean to be formed. Pontiac also became embittered, and finally determined to concentrate he hatred of all the western tribes in one great effort to drive out the English. At the end of 1762 he sent messengers to the different nations, proposing that in May, 1763, they should rise, massacre the English garrisons, and fall upon the frontier settlements. The plot was generally successful. Pontiac had reserved for himself the attack upon Detroit, but before it was made his intention was discovered. He then regularly besieged the place, and neglected no expedient that savage warfare could suggest to take it. To obtain food for his warriors he issued promissory notes, drawn upon birch bark and signed with the figure of an otter, which were all redeemed. After the siege had continued from May 12 until Oct. 12 it was raised, and the tribes generally sued for peace. But Pontiac was not yet subdued. He endeavored to stir up the Indians on the Miami and in other parts of the West, and applied for aid in vain to the French commander at New Orleans. He at last made a stand in the Illinois country, where for a time he had the active coöperation of the French fur traders; but even his more immediate followers fell away from him, and he then accepted the peace which the English offered. From this time he had no importance, and in 1766 he formally submitted to the English rule. He was killed by an Illinois Indian at Cahokia opposite St. Louis, while drunk.—See "History of the Conspiracy of Pontiac," by F. Parkman (Boston, 1851).

PONTIFEX, in ancient Rome, the title of a priest. The office of pontifex is said to have been created by Numa, and under him the pontifices were 4 in number, exclusive of the pontifex maximus, or chief priest. The pontifices were not attached to the worship of any particular divinity, but were a college of priests superior to all others, and superintended the whole public worship. In 300 B. C. the whole number was increased to 9, in 81 by the dictator Sylla to 15, and by Julius Cæsar to 16. The pontifices held office for life. Upon the death of a pontifex a successor was chosen, originally by the college of priests, but in 104 this election was given to the people by the *lex Domitia*. The college of priests had the superintendence of religion, kept the books of ritual ordinances, and were required to give information to any one who might consult them on matters of religion. It was their duty to guard against irregularity in the observance of religious rites, and to determine every thing in relation to burials, and how the manes of the departed should be appeased. Over all classes of the people they had the power of judicial decision and punishment in religious matters, could make new laws and regulations, and were themselves not subject to any court of law, nor responsible either to the senate or to the people. The pontifex maximus was the president of the college, and acted in its name. He was obliged to live in a *domus publica*, and was not allowed to leave Italy. This latter law was first violated in 131 B. C. and afterward was never very strictly observed.

A pontifex might hold any other office, civil, military, or priestly, provided it did not interfere with his pontifical duties. There are several instances in which the offices of pontifex maximus and consul were held in conjunction. The college of pontifices existed until the final overthrow of paganism, though it had retained in its latter years but very little of its ancient power or respect.

PONTIFICAL STATES. See PAPAL STATES.

PONTINE MARSHES, a low marshy plain in the S. part of the Campagna of Rome, extending along the Mediterranean coast from Cisterna to Terracina, a distance of about 25 m. Its breadth varies from 4 to 11 m., and its area is about 80 sq. m. These marshes are formed by the stagnation of the waters of the numerous streams which flow down the Volscian mountains or take their rise in springs at their foot, and are prevented from finding an outlet to the sea by the low level of the plain and the accumulation of sand upon the coast. Although there is little doubt that this tract of ground was of a later formation than the surrounding territory, the opinion of the Romans that it had its origin since the historic period is probably erroneous. This impression seems to have sprung from the belief that Mons Circeius was in the time of Homer surrounded by the sea, and was the island of Circe mentioned by that poet. Pliny preserves a tradition that these low grounds formerly contained 24 cities; but this is evidently false, as no traces of their site or even of their names can be found. The name of the marshes was derived from Suessa Pometia, a Volscian town somewhere on their borders, which about 500 B. C. disappeared from history, and the position of which is not now known. Various attempts were made by the Romans to drain the marshes, both for the sake of the land, and to prevent the miasma which was sometimes borne by the south wind as far as Rome itself. As early as 312 B. C. the Appian way seems to have been carried through this district, and along with it a canal from Appii Forum to Terracina. In 160 B. C. an attempt to drain the marshes was made by the consul Cornelius Cethegus; but, though this was apparently attended with success, the tract had so soon reverted to its original condition that its drainage was one of the public works projected by Cæsar, which however he did not live to execute. With the exception of temporary improvements, nothing was done by the succeeding emperors to accomplish this work until the reign of Trajan, who restored completely the Appian way. During the wars preceding the downfall of the Roman empire the marshes had been suffered to revert to their original condition, and Theodoric undertook the drainage with considerable success. But the commotions of the time soon caused them to be neglected, and they became as uninhabitable as ever, remaining so with scarcely any change until the reign of Pope Pius VI. Boniface VIII. had indeed caused the district about Sezzo and Sermoneta to be drained by a large canal; and in 1417 Martin V. had another canal, called the Rio Martino, dug to within a mile of the sea, when the project was abandoned at his death. The district was granted by Leo X. to the Medici, upon the condition of their draining it, and it remained in their hands 69 years, during which time scarcely any thing was done toward its improvement. A large canal, called the Fiume Sisto, was dug during the reign of Sixtus V.; but after the death of that pontiff in 1590 the dams gave way, and the country was again flooded. When Pius VI. became pope, he directed his attention to draining the marshes, and the work was begun in 1778, and completed in 1788. The line of the Appian way was in part restored, and the canal attributed to Augustus was again opened under the name of Linea Pia. It has been found almost impossible, however, to reclaim the waste land, although there is much under cultivation, and large pastures abound, where horses, cattle, and buffaloes graze. The district called Pomptinus Ager, often portioned out to Roman colonists, was probably the land bordering on the marshes, and not the marshes themselves.

PONTOPPIDAN, ERIK, a Danish antiquary, born in Aarhuus, Jutland, in 1698, died in Bergen in 1765. He was the son of a clergyman, and was graduated in divinity at the university of Copenhagen. After travelling as tutor with several young noblemen, he became professor of theology at Copenhagen in 1738, and bishop of Bergen in Norway in 1747. In 1730 he published a description of the geography, natural history, antiquities, &c., of Denmark, under the title of *Theatrum Daniæ Veteris et Modernæ*, and afterward treated the same subjects more fully in his *Danske Atlas eller kongen Riget Dænemark* (7 vols. 4to., Copenhagen, 1763–'74). Among his other works are: *Gesta et Vestigia Danorum extra Daniam* (1740); *Annales Ecclesiæ Daniæ* (1741–'52); *Glossarium Norvegicum* (1749); and *Det förste Forsög paa Norges naturlige Historie* (1752), which has been translated into English. He was the first to give an account of the kraken.

PONTORMO, JACOPO CARRUCCI, surnamed Il Pontormo, an Italian painter, born at Pontormo, Tuscany, in 1493, died in 1558. A pupil of Andrea del Sarto, he won the commendations of Michel Angelo and Raphael, whereupon his master from jealousy expelled him from his studio. He did not however fulfil the hopes of his admirers, and left but few historical pictures, the most valuable of which is the "Visitation of our Lady," in the Annunziata at Florence. In portraiture his works rank among the masterpieces of the Florentine school.

PONTOTOC, a N. co. of Miss., watered by the Tallahatchee and Yallobusha and branches of the Tombigbee river; area, about 900 sq. m.; pop. in 1860, 22,114, of whom 7,596 were slaves. It has an undulating surface and fertile soil.

e productions in 1850 were 667,612 bushels Indian corn, 110,871 of sweet potatoes, 82,181 l. of rice, and 9,017 bales of cotton. There are 2 grist mills, 6 saw mills, 2 tanneries, 2 ewspaper offices, 47 churches, and 576 pupils tending public schools. Capital, Pontotoc.

PONTUS, an ancient division of Asia Minor, mprised within the boundaries of the pres- t Anatolia. It derived its name from its uation upon the S. shore of the Pontus Eux- us, and was bounded E. by Colchis, S. by Ar- enia Minor, Cappadocia, and Galatia, and W. y the river Halys. Xenophon is the earliest thor by whom this district is called Pontus; had previously been designated by the names f the various tribes that inhabited it. Some f these tribes were extremely wild and savage, ut the Greek colonies established upon the oast as early as the 7th century B. C. gradu- lly spread culture and civilization. While the hole country was under the dominion of Per- a, and in the reign of Artaxerxes II. about the ginning of the 4th century B. C., Ariobar- anes conquered several of the Pontian tribes nd first established the country as an inde- endent kingdom. In the reign of Mithridates I. the kingdom acquired political importance, nd during the troubles following the death of lexander secured its independence. Under Mithridates VI. it was subdued by the Romans nd dismembered, the eastern part being given gain to its earlier savage owners, and the west- rn part annexed to Bithynia. A portion of his territory was subsequently made a sover- ignty under Polemo, and the whole became a Roman province, A. D. 67.

PONTUS EUXINUS. See BLACK SEA.

POODLE (*canis aquaticus*), the barbet or water dog. It has a high and round head, large cavity for the brain, expanded frontal sinuses, long ears, compact body, and rather short legs. The hair is long, curly, black, white, or the two mixed, sometimes with rufous marks. The large variety stands 16 to 20 inches high at the shoulders, and has coarse curled hair, often shaved to represent a miniature lion; the muzzle is short and prominent, and the tail is rather short and somewhat erect. It has long been known to fishermen and sportsmen as an excellent water dog; the sense of smell is exquisite, which gives it a remarkable power of tracing out the lost property of its master; it is strong, intelligent, and affectionate; it used to be a great favorite with soldiers on the continent of Europe, and many affecting anecdotes are on record of its fidelity to its living and attachment to its dead master. There is a diminutive breed, with longer, more silky, and curly hair, generally white, fit only for a lap dog; it is often the companion of unmarried and elderly ladies and childless wives.

POOLE, MATTHEW, an English divine and critic, born in York in 1624, died in 1679. He was educated at Emmanuel college, Cambridge, took orders, and in 1649 obtained the rectory of St. Michael le Quern, London, but resigned it upon the passage of the uniformity act in 1662. He was engaged in many of the controversies of his time, especially in those upon nonconformity, and wrote much in opposition to the Roman Catholic church. His last years were spent in Holland. His principal work is the *Synopsis Criticorum Biblicorum* (5 vols. fol., 1669-'76), a digest of the *Critici Sacri* (1660), presenting in a condensed form the views of 150 commentators.

POONAH, a district of British India, presidency of Bombay, bounded N. and E. by Ahmednuggur and Sholapore, S. and S. W. by Sattara, and W. by Tannah, extending from lat. 17° 53' to 19° 26' N., and from long. 73° 20' to 75° 10' E.; area, 5,298 sq. m.; pop. in 1855, 666,006. The district is included within the limits of the Deccan. The general elevation is about 2,000 feet above the sea, and the surface is intersected by numerous spurs and offsets from the W. Ghauts, which traverse the country in a S. E. direction, decreasing gradually in height till they sink into the plains in the Nizam's dominions. The principal rivers are the Beemah and its tributaries, the most important of which is the Neera. The climate is remarkably dry, the annual fall of rain being less than 20 inches. The soil is arid, and in many places water cannot be procured by sinking wells. Different kinds of grain and potatoes are cultivated, and cotton is grown to a small extent; but the country is almost entirely destitute of trees. The great Indian peninsular railway traverses the district. The inhabitants are chiefly Mahrattas, but there are a few Guzerattees and some Mohammedans.—POONAH, the capital, is situated at the junction of two tributaries of the river Beemah, 74 m. S. E. from Bombay; pop. 90,000. It was formerly the capital of the Mahratta confederacy, and the chief building in the town is the palace of the peishwa, now used as a prison, hospital, and lunatic asylum. The place is an important military station, and the British cantonments there are among the most extensive in India.

POOR, DANIEL, an American missionary, born in Danvers, Mass., June 27, 1789, died in Mampy, Ceylon, Feb. 3, 1855. He was graduated at Dartmouth college in 1811, and at the theological seminary at Andover in 1814. In Oct. 1815, he sailed for Ceylon in company with other missionaries, and reached Colombo in March, 1816. He took his station at Tillipally near Jaffna, studied the Tamul language, and in July, 1823, took charge of the mission seminary at Batticotta. In March, 1836, he removed to Madura, where 37 schools were soon opened mainly through his agency. He went back to Tillipally in 1841 on account of his health, and there labored until 1848, when he returned to the United States, where he spent 2 years working for the missionary cause. Returning to Ceylon in 1850, he settled at Mampy, where he resided until his death. He published several tracts, &c., in the English and Tamul languages.

POOR LAWS. See PAUPERISM.

POPAYAN, a city of New Granada, capital of the state of Cauca, and of a province of the same name, situated 6,000 feet above the sea on the river Cauca, in the great plain between the Cordillera of Quindin and that of Choco; pop. 20,000. It has a cathedral and numerous public edifices, and under the Spanish rule was a flourishing city; but its importance has been much reduced in consequence of the earthquake of 1834, and the unsettled state of the country. Its former trade in the precious metals has been in great measure destroyed, and its commerce is now confined chiefly to articles of produce. It is still, however, a place of importance from its position as a commercial mart between Quito and Bogota, and from the fact that a great commercial road nearly 1,000 m. long extends from it to Truxillo in Peru. Popayan was founded in 1537, being the first city built by Europeans in this portion of South America.

POPE. I. A S. co. of Ill., bordered S. E. by the Ohio river, which separates it from Ky., and intersected by Big Bay creek; area, 374 sq. m.; pop. in 1860, 6,742. It has a rolling surface, and the soil is a fertile sandy loam. The productions in 1850 were 223,592 bushels of Indian corn, 10,958 of oats, 2,352 of wheat, 2,937 lbs. of wool, and 13,922 of butter. There were 29 churches, and 570 pupils attending public schools. Capital, Golconda. II. A N. W. co. of Ark., bordered S. partly by the Arkansas river, which intersects the S. W. corner, and W. partly by Big Piney creek, and drained by Illinois bayou and other streams; area about 600 sq. m.; pop. in 1860, 3,855, of whom 2,440 were slaves. It has a hilly surface and fertile soil. The productions in 1850 were 202,830 bushels of Indian corn, 12,586 of sweet potatoes, 1,056 bales of cotton, and 3,780 lbs. of tobacco. There were 10 grist mills, 14 saw mills, 2 tanneries, 11 churches, and 326 pupils attending public schools. Capital, Dover.

POPE (Gr. παπα, father), a title applied by the eastern Christians to all priests, and in the West originally given to all bishops, but now restricted to the bishop of Rome. The Roman Catholics regard the pope as the legitimate successor of St. Peter and the visible head of the church, the invisible head being Christ. He was anciently elected by the people of his diocese, but is now chosen by the cardinals, a vote of two thirds being required to elect. On account of the union of temporal and ecclesiastical power in his person, it has long been an understood condition that he should be an Italian. (See PAPAL STATES.) The last pope of foreign birth was Adrian VI. (1522), a native of Utrecht. According to Roman Catholic writers, the bishop of Rome has always been recognized as the superior of all other Christian bishops; but Protestant historians date his supremacy generally from about the 4th century. We subjoin a table of the popes, according to the Roman *Notizie*, with the dates of the commencement of their reigns. The names printed in Italics are those of antipopes.

St. Peter	42
St. Linus	66
St. Anacletus	78
St. Clement I.	91
St. Evaristus	100
St. Alexander I.	108
St. Sixtus I.	119
St. Telesphorus	127
St. Hyginus	139
St. Pius I.	142
St. Anicetus	157
St. Soterus	168
St. Eleutherius	177
St. Victor I.	193
St. Zephirinus	202
St. Calixtus I.	217
St. Urban I.	223
St. Pontianus	230
St. Anterus	235
St. Fabian	236
St. Cornelius	250
St. Lucius I.—*Novatianus*	252
St. Stephen I.	253
St. Sixtus II.	257
St. Dionysius	259
St. Felix I.	269
St. Eutychianus	275
St. Caius	283
St. Marcellinus	296
(See vacant 3 yrs. and 6 mos.)	
St. Marcellus I.	308
St. Eusebius	310
St. Melchiades or Miltiades	311
St. Sylvester I.	314
St. Marcus	336
St. Julius I.	337
Liberius	352
St. Felix II. (sometimes reckoned an antipope)	355
St. Damasus I.	366
St. Siricius	384
St. Anastasius I.	398
St. Innocent I.	402
St. Zosimus	417
St. Boniface I.—*Eulalius*	418
St. Celestine I.	422
St. Sixtus III.	432
St. Leo I. the Great	440
St. Hilary	461
St. Simplicius	468
St. Felix III.	483
St. Gelasius I.	492
St. Anastasius II.	496
St. Symmachus	498
St. Hormisdas—*Laurence*	514
St. John I.	523
St. Felix IV.	526
Boniface II.—*Dioscorus*	530
John II.	533
St. Agapetus I.	535
St. Sylverius	536
Vigilius	537
Pelagius I.	555
John III.	560
Benedict (I.) Bonosus	574
Pelagius II.	578
St. Gregory I. the Great	590
Sabinianus	604
Boniface III.	607
St. Boniface IV.	608
St. Deusdedit	615
Boniface V.	619
Honorius I.	625
(See vacant 1 yr. and 7 mos.)	
Severinus	640
John IV.	640
Theodorus I.	642
St. Martin I.	649
St. Eugenius I.	654
St. Vitalianus	657
Adeodatus	672
Donus or Domnus I.	676
St. Agathon	678
St. Leo II.	682
St. Benedict II.	684
John V.	685
Conon — *Theodorus; Paschal*	686
St. Sergius I.	687
John VI.	701
John VII.	705
Sisinnius	708
Constantine	708
St. Gregory II.	715
St. Gregory III.	731
St. Zachary	741
Stephen II. (died before consecration)	752
Stephen III.	752
St. Paul I.—*Constantine; Theophylactus; Philip*	757
Stephen IV.	768
Adrian I.	772
St. Leo III.	795
Stephen V.	816
St. Paschal I.	817
Eugenius II.	824
Valentinus	827
Gregory IV.	827
Sergius II.	844
St. Leo IV.	847
Benedict III.—*Anastasius*	855
St. Nicholas I.	858
Adrian II.	867
John VIII.	872
Marinus I. or Martin II.	882
Adrian III.	884
Stephen VI.	885
Formosus	891
Boniface VI. (reigned only 18 days, and not included among the popes by Baronius and others)	896
Stephen VII.	896
Romanus	897
Theodorus II.—*Sergius III.*	898
John IX.	898
Benedict IV.	900
Leo V.	903
Christopher	903
Sergius III.	904
Anastasius III.	911
Lando	913
John X.	914
Leo VI.	928
Stephen VIII.	929
John XI.	931
Leo VII.	936
Stephen IX.	939
Marinus II. or Martin III.	943
Agapetus II.	946
John XII.—*Leo VIII.*	956
Benedict V.	964
John XIII.	965
Benedict VI.	973
Donus or Domnus II.	974
Benedict VII.	975
John XIV.—*Boniface VII.*	983
John XV.	985
Gregory V.—*John XVI.*	996
Sylvester II.	999
John XVI. or XVII.	1003
John XVII. or XVIII.	1003
Sergius IV.	1009
Benedict VIII.—*Gregory VI.*	1012
John XVIII. or XIX.	1024
Benedict IX. (deposed) *John XX.*	1033
Gregory VI.—*Sylvester III.*	1045
Clement II.	1046
Damasus II.—*Benedict IX.* attempts to resume the throne	1048
St. Leo IX.	1049
Victor II.	1055
Stephen X.	1057
Benedict X.	1058
Nicholas II.	1058

ander II.—Hono-
ius II.............1061
gory VII. (Hilde-
brand)—Clement III. 1073
(See vacant 1 year.)
tor III.............1086
ban II.............1088
chal II.............1099
lasius II.—Gregory
VIII.............1118
ixtus II.............1119
orius II.—Celestine
II.............1124
ocent II.—Anacle-
tus II.; Victor IV... 1130
estine II.............1143
ius II.............1144
genius III.............1145
astasius IV.............1153
rian IV. (Nicholas
Breakspear, an Eng-
lishman).............1154
xander III.—Victor
IV.; Paschal III.;
Calixtus III.; Inno-
cent III.............1159
cius III.............1181
ban III.............1185
gory VIII.............1187
ment III.............1187
estine III.............1191

Innocent III.............1198
Honorius III.............1216
Gregory IX.............1227
Celestine IV.............1241
(See vacant 1 yr. and 7 mos.)
Innocent IV.............1243
Alexander IV.............1254
Urban IV.............1261
Clement IV.............1265
(See vacant 2 yrs. and 9 mos.)
Gregory X.............1271
Innocent V.............1276
Adrian V.............1276
John XIX., or XX.,
or XXI.............1276
Nicholas III.............1277
Martin IV.............1281
Honorius IV.............1285
Nicholas IV.............1288
(See vacant 2 yrs. and 3 mos.)
St. Celestine V.............1294
Boniface VIII.............1294
Benedict XI.............1303
Clement V. (seat of the
papacy removed to
Avignon).............1305
(See vacant 2 yrs. and 3 mos.)
John XXII.............1316
Benedict XII.—*Nicholas V. at Rome*.............1334
Clement VI.............1342

Innocent VI.............1352
Urban V.—*Clement VII.* 1362
Gregory XI. (Seat restored to Rome).............1370
Urban VI.............1378
Boniface IX.—*Benedict XIII. at Avignon*.............1389
Innocent VII.............1404
Gregory XII.............1406
Alexander V.............1409
John XXIII.............1410
Martin V.—*Clement VIII.* 1417
Eugenius IV.—*Felix V.* 1431
Nicholas V.............1447
Calixtus III.............1455
Pius II.............1458
Paul II.............1464
Sixtus IV.............1471
Innocent VIII.............1484
Alexander VI.............1492
Pius III.............1503
Julius II.............1503
Leo X.............1513
Adrian VI.............1522
Clement VII.............1523
Paul III.............1534
Julius III.............1550
Marcellus II.............1555
Paul IV.............1555
Pius IV.............1559
St. Pius V.............1566

Gregory XIII.............1572
Sixtus V.............1585
Urban VII.............1590
Gregory XIV.............1590
Innocent IX.............1591
Clement VIII.............1592
Leo XI.............1605
Paul V.............1605
Gregory XV.............1621
Urban VIII.............1623
Innocent X.............1644
Alexander VII.............1655
Clement IX.............1667
Clement X.............1670
Innocent XI.............1676
Alexander VIII.............1689
Innocent XII.............1691
Clement XI.............1700
Innocent XIII.............1721
Benedict XIII.............1724
Clement XII.............1730
Benedict XIV.............1740
Clement XIII.............1758
Clement XIV.............1769
Pius VI.............1775
Pius VII.............1800
Leo XII.............1823
Pius VIII.............1829
Gregory XVI.............1831
Pius IX.............1846

POPE, ALEXANDER, an English poet, born London, May 21, 1688, died at Twickenham, ddlesex, May 30, 1744. His father was a man Catholic, who, having acquired a small rtune as a linen merchant, retired on the revtion of 1688 to Binfield in Windsor forest. lexander inherited a crooked body and a kly constitution. His first education, to use s own words, was "extremely loose and disnted." Having taught himself to write copying out of printed books, he learned a tle Greek and Latin from a priest named Banter, and was then sent to school, first at Twyd, where he was flogged for lampooning his ster, and then at London, where he seems have studied little but Dryden, Spenser, and aller, Ogilby's translation of Homer, and ndys's translation of Ovid. Dryden was his ster in the art of poetry. He professed for m the warmest admiration, studied his works ntently, copied his style, and records as a morable incident, that when he was about 2 years old he had a glimpse of the great poet, en in the last year of his life. Soon after is Pope went home to Binfield, and entered a course of self-education which he continued with diligence until he was 19 or 20. e taught himself French, Latin, and Greek, rough the medium of translations, getting, as ld be expected, only a superficial knowldge of them, but devoting himself with more mplete success to various kinds of poetical mposition. The earliest of his pieces extant s "Ode on Solitude," written when he was out 12. From his 13th to his 15th year he as engaged upon "Alexander," an epic poem, of hich he had finished 4 books when he burned . In the mean time he composed a comedy nd a tragedy, which were likewise destroyed, nd gave promise of his satirical powers in ome "Lines to the Author of a Poem entitled uccessio" (Elkanah Settle), which were printed veral years later by Lintot in a volume of "Miscellaneous Poems and Translations" (1712). His imitations of some of the English poets, translations of the first book of the *Thebais* of Statius, and of Ovid's epistle from Sappho to Phaon and part of the "Metamorphoses," and the fables of "January and May" and the "Wife of Bath" from Chaucer, belong to nearly the same period; but none of his youthful compositions were published earlier than his 21st year, when they had probably received many corrections. About 1704 he was introduced by Sir William Trumbull to the veteran dramatist Wycherley. Pope "ran after him like a dog," and made under his auspices his first acquaintance with the coffee house wits of London. Wycherley in turn submitted his verses to the boy poet for correction, but the freedom with which Pope exercised his critical office soon resulted in a quarrel. Garth and Congreve were also among his early friends. In 1709 he established his position as the first poet of his time by the publication of his "Pastorals," written 5 years before. They appeared in the 6th volume of Tonson's "Poetical Miscellany," with the version of Chaucer's "January and May," and a translation of the episode of Sarpedon from the Iliad. He had already begun the "Essay on Criticism," which was published anonymously in 1711, and assailed by John Dennis with the most extravagant abuse. Addison praised it in the "Spectator" (No. 253) as "a masterpiece in its kind;" a commendation which, despite the faulty construction of the poem, nearly all subsequent critics have confirmed. In the next year Pope contributed to the "Spectator" the "Messiah, a Sacred Eclogue," one of the most popular and elevated of all his compositions. The first sketch of the "Rape of the Lock," a mere skeleton of what the poem afterward became, appeared in Lintot's collection of "Miscellaneous Poems and Translations" in 1712. It originated in a quarrel between two families of quality on account of the stealing of a lock of hair from the head of a reigning belle, and Pope was urged "to write a poem to make a jest of it, and laugh them together again." Whether it had the intended effect or not is doubtful, but its literary success at all events was such that the author determined to enlarge it, and in 1714 it was accordingly printed with the addition of the supernatural machinery and a dedication to Miss Arabella Fermor, the heroine of the piece. If not the greatest, it is the most highly finished and most delightful of his poems. About the beginning of 1713 he resolved to become a painter, and accordingly went to London, where for a year and a half he studied under Jervas, a pupil of Sir Godfrey Kneller. He had a strong natural taste for the art, but his bad eyesight was an insuperable bar to success; and after throwing away "three Dr. Swifts, two Lady Bridgewaters, a duchess of Montague, half a dozen earls, and one knight of the garter," and executing a few pieces which have had a better fate, he returned with fresh ardor to his more congenial pursuits. A descriptive poem on "Windsor Forest," which does not rank among his happiest productions, appeared in 1713, though the greater part of it had been written when he was only 16; and an "Ode for Music on St. Cecilia's Day," which is unfortunate in provoking comparison with the magnificent composition of Dryden on the same subject, was also published in this year. In the mean time Pope had found in a Roman Catholic family at Mapledurham near Binfield two friends with whom his name has always been associated, and who inspired some of the best of his letters and shorter poems. These were Teresa and Martha Blount, young ladies of good family and nearly his own age. Martha, the younger sister, was his devoted friend through life and his principal heir. Her intercourse with him did not escape the imputations of scandal, but it is now agreed that no imputations could be more unjust. Another of his friends was Gay; the publication of "Windsor Forest" led to his intimacy with Swift and Arbuthnot; and Steele, who was one of the first to appreciate his genius, introduced him to Addison. For the first performance of Addison's "Cato" (1713) he wrote a prologue which was not less popular than the tragedy itself; and when Dennis attacked the play he hastened to revenge his friend in a "Narrative of Dr. Robert Norris [a noted quack who pretended to cure lunatics] concerning the strange and deplorable Frenzy of J. D." Addison seems to have been displeased with Pope's officiousness, and took the pains to disavow all responsibility for the satire; but the friendly intercourse between the essayist and the poet was still uninterrupted, and Pope continued to write for the "Guardian," to which he had already contributed several papers. One of the best of these was a sarcastic parallel between his own pastorals and those of his rival Ambrose Philips, whom Steele in the same publication had pronounced the legitimate successor of Spenser.—Pope had so far been supported by a moderate allowance from his father; all his poetry together had not brought him £100. With the purpose of replenishing his purse, and encouraged by the advice of Addison, he now issued proposals for a poetical translation of the Iliad, to be published by subscription in 6 volumes at a guinea each. Swift exerted himself to promote the sale, and the young author's reputation was already so high that over 650 copies were subscribed for. Pope however was no master of Greek, and with all the help of various translations, had at first such "terrible moments" that he wished a hundred times somebody would hang him. But as the work went on his equanimity returned, the task became lighter, and he fell into the method of translating 30 or 40 verses before he got up, and working upon it the rest of the morning. "My usual method," he says, "was to take advantage of the first heat, and then to correct each book, first by the original text, then by other translations, and lastly to give it a reading for the versification only." In this way the work was finished in about 6 years, the first volume appearing in 1715 and the last in 1720. He had no cause to be dissatisfied with either the price of his labor or the reputation which it brought him. Beside the subscription money, he received from Lintot the publisher £200 for each volume; and his total receipts, according to Dr. Johnson, were £5,320, not reckoning the large sums paid by some of his subscribers in addition to the regular price. The king, for instance, gave him £200 and the prince of Wales £100. The life of Homer prefixed to the work was written by Parnell, and the information for the notes was gathered principally from Eustathius, by Broome, Jortin, and another whose name is not mentioned. Almost simultaneously with the publication of the first volume appeared a translation of the first book of the Iliad by Tickell. Pope says the nation was not more divided about whig and tory than the idle fellows of the feather were about the two translations. Addison gave the preference to Tickell, a preference not unreasonably suspected of springing from personal motives, and Pope even looked upon him as the real author of the verses which passed under Tickell's name. The result was an open quarrel with Addison, whom Pope afterward satirized in a piece which stands almost unrivalled in English poetry; it was first published in 1723, and again in 17[illegible], and was finally, with some changes, incorporated with the "Prologue to the Satires." He sent a copy of it to Addison before it was printed, and says "he used me very civilly ever after." During the progress of the Iliad Pope often visited London, gamed, drank, had "luxurious lobster nights," grew ashamed of business, railed at poor authors, frequented e drawing rooms of women of rank and hion, and the country seats of the nobility, ere his charming conversation made him ays welcome, and in a word set up for

The gayest valetudinaire,
Most thinking rake alive.

dy Mary Wortley Montagu made a particu- r impression upon him, and was one of his rrespondents. He soon tired however of a e of dissipation, and, the estate at Binfield ving been sold, removed with his parents to iswick, where he published a collection of poems (1 vol. fol. and 4to., 1717), in which t appeared his "Elegy to the Memory of Unfortunate Lady," and the "Epistle of oisa to Abelard," the most passionate of his orks. Of the concluding portion of this em, in which he refers to some future bard

Condemned whole years in absence to deplore,
And image charms he must behold no more,

writes to Lady Montagu, then at Constanti- ple: "You will find one passage that I can- t tell whether to wish you should understand r not." Soon after this, his father having ed, he purchased the lease of a villa on the ames at Twickenham, where in constructing rotto and decorating the grounds he found a axation from severer pursuits. When Lady ary returned to England (Oct. 1718), he rsuaded her to take up her residence near ickenham. But the ardor of his affection on cooled; they met seldom, and finally arrelled, and the lady to whom he had ad- essed the most impassioned love verses be- me the object of the coarsest of his satires. satisfactory explanation of their quarrel s ever been given; it is very commonly rified to a declaration of love by the poet lar circumstances which provoked the lady to an immoderate fit of laughter—a cause ite sufficient in Pope's case to account for e malignant hatred which he evidently bore er. While her influence was on the decline seems to have been smitten by the charms f another lady, "the mild Erinna, blushing her bays," with the idea of whom he says he came so mad as to steal her portrait and pass hole days in sitting before it. This is now ertained to have been Judith Cowper, after- ward Mrs. Madan, the aunt of the poet Cowper. —Pope's reputation was now so high that nson made him an offer to undertake an ition of Shakespeare, a task for which he d hardly a single qualification. The work as published in 1725 in 6 vols. 4to., and, ough abounding in faults of all kinds, had least the merit of pointing out the way r some future correction of the text. His nders and shortcomings were exposed by plodding author named Theobald, at first in treatise called "Shakespeare Restored," and terward in a formal edition, for which he as suitably rewarded in the "Dunciad." At e same time Pope had "undertaken" for ntot a translation of the Odyssey, the first volumes of which appeared in 1725, and the remaining 2 in 1726. Though he pro- fessed to have had the assistance of two friends (Broome and Fenton), he concealed the amount of this assistance, his own share comprising only 12 books, or one half the whole work. After deducting about £800 paid to his coadju- tors, his profits from the translation amounted to £2,885. Of this translation Bentley is said to have told him: "It is a pretty poem, Mr. Pope; but you must not call it Homer." On the other hand, as Dr. Johnson observes, he left in his versions "a treasure of poetical ele- gances to posterity," and "a series of lines so elaborately corrected and so sweetly modulated that the vulgar was enamored of the poem and the learned wondered at the translation." In 1727–'8 he published in conjunction with Swift 3 volumes of "Miscellanies," in which appeared his "Treatise of Martinus Scriblerus on the Bathos, or the Art of Sinking in Poet- ry," which gave rise to the "Dunciad." The "Treatise" was intended to form part of a larger prose work entitled "Memoirs of Mar- tinus Scriblerus," in which Pope, Swift, Ar- buthnot, Parnell, Lord Oxford, Atterbury, Con- greve, Gay, and others undertook to ridicule all the false tastes in learning. The project was abandoned in 1715 when the members of the Scriblerus club were dispersed, but to it we owe both the "Dunciad" and "Gulliver's Trav- els." The authors attacked in the "Treatise" retaliated in a number of publications, and even threatened Pope with personal violence. Thus provoked, he determined to crush the whole host of scribblers in one great effort of his genius, and, guided by the advice of Swift, who contributed largely to the prolegomena and notes, produced in 1728 that immortal poem "The Dunciad." The plan was bor- rowed from Dryden's "MacFlecknoe," and the hero at first was Theobald, who in a later edition was dethroned to make room for Colley Cib- ber. The sensation caused by the poem was immense. It was presented by Walpole to King George II., who was pleased to declare that Mr. Pope was "a very honest man." On the morning of publication the "dunces" be- sieged the printer's shop in crowds to prevent its sale, and failing in that held weekly clubs to concert hostilities. Dennis, who had re- ceived a conspicuous place in the satire, pub- lished several retaliatory pieces; but a few years later, when he was blind and in distress, Pope wrote a prologue to a play which was performed for his benefit. His triumph was now complete, and he could afford to be mag- nanimous.—The class of compositions to which Pope next applied himself, namely, his ethical poems, form the most refined and intellectual of his works. In 1731 appeared his epistle on "Taste," addressed to Lord Burlington (after- ward entitled "Of False Taste," and finally "Of the Use of Riches"), and in the next year an epistle to Lord Bathurst "On the Use of Riches." These are now known as the 4th and 3d of the "Moral Essays;" the 1st, to Lord numerous suckers from the roots render it objectionable. The wood is soft and nearly worthless. The narrow-leaved poplar (*P. angustifolia*, Torrey) is, according to Nuttall, the cottonwood noticed by Lewis and Clark in their expedition, and was seen frequently by him on the banks of the river Platte and its tributaries. The height of this species, which nearly resembles the balsam poplar, is from 60 to 100 feet; its smaller branches are round and smooth, and the leaf buds resinous; leaves ovate-lanceolate or acutely lanceolate, smooth above and slightly but obtusely serrate; the wood brittle and poor. It is almost the only tree occurring over wide extents of prairie. In the severity of the winter the Indians collect the branches to feed their horses, and the beaver selects them for his choice food; the resinous buds are also eaten greedily by a species of pigeon. The American aspen (*P. tremuloides*, Mx.) is a small, graceful tree, 20 to 40 feet high, with small and moderately spreading branches; the trunk has a whitish clay-colored bark blotched with very dark brown; the young shoots are of a polished bronze green, gradually changing to gray; leaves round, 2 inches long and of equal breadth, rather heart-shaped at base, abruptly acuminate, the border wavy toothed; the petiole very slender, as long as the leaf, and compressed laterally, from which arrangement the slightest wind agitates them. The wood is soft, fine-grained, light, and very perishable when exposed to the weather; the bark is excessively bitter, with a flavor similar to that of quinine. The tree is found in Canada as far N. as lat. 64°, and thence southward abundantly, and as far W. as the Rocky mountains. The large-toothed aspen (*P. grandidentata*, Mx.) is a tall, erect tree, covered with a smooth bark of a light greenish gray color; the branches are small, and the head is not very broad; the leaves, borne in tufts at the ends of the branches, are roundish, with large, irregular, sinuate teeth; smooth on both sides, but paler beneath; the petioles slender, compressed laterally, two thirds as long as the leaves. It is common in woods from New England to Pennsylvania, Wisconsin, and northward. The wood has been employed in various ways in the arts and used as a fuel, burning like pine when dry. The American black poplar (*P. betulæfolia*, Pursh) is regarded as a variety of the European black poplar, being first noticed in this country by Michaux on the banks of the Hudson river, and still to be found in the neighborhood of Hoboken, N. J., and seldom elsewhere in the United States.—The common black poplar or black-barked poplar is the *P. nigra* of Linnæus, belonging to Europe, growing wild from Sweden to Italy, on the banks of rivers and in moist woods, and rising to the altitude of 50 to 80 feet, with an ample head and numerous branches. The bark is ash-colored, and becomes deeply furrowed with age; the leaves, slightly notched upon their edges, are pale green, the petioles yellowish. The aments appear in March and April; those of the barren flowers are of a dark red color and produce a striking effect; the capsules are round and the seeds enveloped in a beautiful white cotton. The wood is soft, yellow, and fibrous, and is employed in making packing cases, and as it never splinters it is very useful for turning into bowls, trays, and such wares; it is an indifferent fuel; its bark is used in Russia in preparing morocco leather; the resin of the leaf buds is esteemed for healing properties, and bees are fond of the flowers. The white poplar or abele tree (*P. alba*, Linn.) is native of most parts of Europe, growing in moist soils and reaching the height of 80 to 90 feet. It is conspicuous for its singular, lobed leaves, which are dark green above and very white beneath. It is a popular ornamental tree in streets, cemeteries, and public squares, but its propensity to throw up suckers from the roots renders it somewhat objectionable where neatness is required. For planting out in poor and thin soils and in sandy areas, especially near the sea coast, this very disposition to spread rapidly over the soil renders it worthy of attention. There are numerous varieties, but the principal one is the hoary poplar (*P. canescens*, Smith), which differs in a roundish, deeply waved foliage, cylindrical aments, and 8 stigmas in the fertile flower; the bract is also more deeply and regularly cut. Its wood is adapted for fuel, and ranks highest of all the European poplars. The trembling poplar or European aspen (*P. tremula*, Linn.) is a rapidly growing tree of middle size, with a clear, straight trunk, and smooth bark, becoming gray and cracking with age; the branches, which are few, become pendulous; the young shoots are tough, pliant, and of a reddish color; the flowers appear early; petioles compressed; leaves roundish ovate or nearly orbicular and toothed, at first downy, but at length smooth on both sides. This species grows with great rapidity, being fond of wet soils and occurring in widely separate regions of Europe and Asia. The wood is tender and white, and employed by turners, engravers, cabinet makers, &c., and also used for burning into charcoal; its bark is employed for tanning; the leaves, either green or dry, are eaten readily by cattle and sheep. It is prized as an ornamental tree, especially in landscape gardening, and many superstitions are attached to the peculiarity of its trembling leaves when moved by the slightest breezes. The Lombardy poplar (*P. dilatata*, Aiton) is well known and readily distinguished by its tall, narrow form and tapering proportions. It has been considered as indigenous to Italy, particularly to the banks of the Po; but its native country is Persia, and it is found growing wild in the Himalaya. It was probably introduced into Italy from Persia; no mention is made of it by the Roman agricultural writers. Both in Europe and America its principal use seems to have been that of planting by canals and in rows along avenues, public squares, and roadsides. Among round-headed trees it groups well, and makes a fine contrast by its graceful and cypress-shaped outline. The Lombardy poplar has been known to grow 100 to 120 feet high, but it is not usual to see such specimens in this country. It is spoken of for its beauty on its native plains in the East. It flowers early in the season; the aments of barren blossoms are of a rich deep crimson, but they are seldom noticed, as they grow upon the uppermost branches. It was once a favorite in the United States, having been introduced about a century since, but is much out of favor now. Its wood is small in quantity in proportion to the size of the tree, and is nearly worthless.—The poplars are all easy of cultivation, increasing readily from suckers and cuttings. The wood of several species communicates various dyes to wool.—The term poplar is applied to the tulip tree (*Liriodendron tulipifera*), a noble and useful tree with which the true poplars have no affinity.

POPOCATEPETL (Nahuatl or Aztec, *popoca*, to smoke, and *tepetl*, mountain), or VOLCAN GRANDE DE MEXICO, a volcano situated about 30 m. S. W. of the city of Mexico. It has an elevation of 17,720 feet, or 1,946 feet higher than Mont Blanc, while the plain from which it is viewed is itself 7,000 feet above the level of Lombardy. It is connected with the volcano of Iztaccihuatl by a high ridge, which, at the pass of Ahualco, is 10,520 feet above the sea, and sometimes covered with snow. It was by way of this pass that Cortes, accompanied by 6,000 Tlascalan Indians, executed, in Oct. 1519, his bold march from Cholula to Tezcuco and Mexico. Popocatepetl was at that time in a state of extraordinary activity; and Cortes relates, in one of his letters to Charles V., that, wishing to discover whence proceeded the volumes of smoke which rose from the mountain, he chose 10 daring men among his companions to climb to its summit, under the lead of Diego de Ordaz, who boasted of having accomplished this feat, and was in consequence permitted by the emperor to emblazon a flaming volcano on his escutcheon. But Cortes states expressly that no one could reach the top of the mountain, in consequence of the great quantities of snow which covered it. He subsequently sent others on the same errand, and in 1522 one of them, Francisco Montaño, not only reached its top, but had himself let down into its crater by ropes to the depth of 70 or 80 fathoms. After a lapse of more than 300 years, the brothers Frederic and William Glennie in 1827 reached its summit and determined its altitude barometrically. They were followed by Samuel Birckbeck in Nov. 1827; by Baron von Gerolt, present minister of Prussia in the United States, in 1834; and on April 11, 1848, by Capt. Charles P. Stone and 5 other officers of the U. S. army then in Mexico. They observed several cones of eruption in the crater, from which proceeded periodical discharges of sulphurous vapors and cinders, of which the larger masses constantly fell back into the crater. A variable column of smoke is now visible from the mountain, but no luminous emanations. The years 1519, 1520, and 1540 alone seem to have been distinguished by igneous eruptions.

PÖPPIG, EDUARD, a German traveller and naturalist, born in Plauen in 1797. He finished his education at the university of Leipsic. In 1822 he went to Cuba, afterward visited the United States, travelled over Chili and Peru, went down the river Amazon, and in 1832 returned to Germany with botanical and zoological collections, and published an account of his travels and of his botanical researches. Since 1837 he has been professor of zoology in the university of Leipsic.

POPPY (*papaver*), the name of annual, rarely perennial, flowering plants, belonging mostly to the old world, and chiefly remarkable for producing in one species the drug known in commerce and medicine as opium. The species are herbs with a milky juice, fibrous roots, and round stems having imperfect nodes; alternate, simple or incised leaves, and nodding flower buds; sepals mostly 2, petals mostly 4; stigmas united into a flat crown of 4 to 20 rays resting on the summit of the ovary; fruit a capsule, short and turgid, with numerous many-seeded placentæ, opening by chinks under the edge of the stigma. The species, about 20 in number, are seldom seen in America except in gardens. The corn poppy (*P. rhœas*, Linn.) has a hairy stem, hispid, pinnate and bipinnate leaves, small scarlet flowers, and a smooth globose capsule. It is a common weed in the corn or grain fields of Europe; its flowers have a tendency to become multiplex-petalled and to assume a diversity of colors, rendering the varieties attractive annuals for the flowering garden. The common field poppy (*P. dubium*, Linn.) is seen in some parts of Pennsylvania and southward, having a stem clothed with slender spreading hairs, leaves pinnately dissected, the segments often incised and decurrent, the sepals hairy, the petals of a light scarlet, and the capsule smooth and obovoid-oblong. It is conjectured that it may become troublesome as an introduced weed unless attended to. The naked-stemmed poppy (*P. nudicaule*, Linn.) is a hairy perennial with pinnatifid leaves and very long peduncles bearing yellow flowers. It is found wild in Labrador and arctic America. The oriental poppy (*P. orientale*, Willd.) is a native of the Levant, and the bracteate poppy (*P. bracteatum*, Lindley) occurs in Siberia; they are both perennial species, with large, rough, pinnate-serrate foliage; the scape is long and 1-flowered, the sepals bristly, the petals large and of a brilliant reddish scarlet; the whole contour of the plants produces a great effect in the garden border.—The opium poppy, a native probably of Asia Minor, has a tall, annual stem; oblong, glaucous, smooth leaves, embracing the stalk; pure white petals, and a smooth globular capsule. There are two varieties, sometimes regarded as distinct species, viz.: the *P. somniferum*, with red, sometimes white flowers, and black seeds in globose capsules, known as the garden poppy; and the *P. officinale*, with pure white flowers and white seeds in ovate-globose capsules, the chinks under the stigma being obliterated. Both of these kinds are cultivated and employed in obtaining opium. When the white-flowered species or varieties become multiplex-petalled, they are very ornamental in the garden, especially such as have crimson stripes and lines upon a pure white ground. If care is taken to save seed from the best flowers, destroying all the inferior and single ones, these peculiar traits can be secured; and when the choicer sorts are sown in patches in rich soil, they should be very carefully thinned, and subsequently on coming into blossom the capsules should be cut off as the petals fall, in order to prolong the blooming. The opium poppy in India is sown in winter, and its products secured before the intense heat comes on. The soil is highly manured and copiously watered, for even the condition of the dew affects the quantity of opium produced. (See Opium.) The poppies are employed in other ways, the petals of the corn poppy being made into a red sirup, and the leaves of the rough poppy (*P. argemone*, Linn.) and of the *P. rhœas* have been used as a pot herb. The seeds of all the species are very numerous, and abound in a bland, sweet, and nutritious oil, not inferior to that obtained from the olive; the marc or cake is fed out to cattle or used as food for poultry. The seeds of the corn poppy are employed in Poland and Russia to make porridge, or for gruel, or as an ingredient in soup.—The poppy is the type of the natural order *papaveraceæ*, which according to Endlicher consists of annual or perennial herbs, rarely shrubby, with simple or occasionally underground tuberous roots; watery, milky, and often yellow juices; round stems bearing leaves and scapes; sessile, often petiolated, alternate leaves, the upper sometimes opposite, simple or compound, more or less divided, very rarely entire; perfect, regular flowers; calyx of 2 or 3 leaves, valvate or imbricate, caducous; corolla with its petals inserted on the receptacle, deciduous and imbricate in estivation, irregularly plicate or plane, the corolla sometimes wanting; stamens inserted on the receptacle, indefinite, multiseriate; stigmata connate; fruit mostly dry; seeds numerous. To this order belong some of the most showy flowers. The Welsh poppy (*meconopsis Cambrica*, Viguier) is remarkable for its yellow blossoms, and is to be met with in botanic gardens. The horn poppy (*glaucium luteum*, Scopoli) has a smooth stem, repand leaves, a roughish warted capsule, and large, numerous, showy flowers, which contrast finely with the glaucous foliage. It is found upon the sea coasts of England, and in waste places in the southern states. The prickly poppy (*argemone Mexicana*, Linn.) is a tall showy plant, with prickly foliage and a yellow juice; the flowers pale yellow or white. Some garden varieties of it with very large and delicate white flowers are very ornamental. The two species of the Californian poppy (*chryseis Californica* and *C. Douglasii*, T. and G.), elegant, low, spreading plants, with a fine-cut, glaucous foliage, and brilliant golden or orange-colored flowers produced throughout the entire summer, are much prized for bedding out in the garden. We have seen the former in a depauperated form becoming an adventitious weed. The bloodroot (*sanguinaria Canadensis*, Linn.) is remarkable for its early and pure snowy white flowers, and its crimson-orange colored juices of intense bitter taste, useful in medicine; and when introduced into the flower borders it vies with the crocus in the sunny days of spring. The *dendromecon rigidum* (Bentham) is a branching, glabrous shrub, with rigid, coriaceous foliage, and large yellow, papaveraceous flowers, found on the summits of the mountains of California.

PORCELAIN. See Pottery and Porcelain.

PORCELAIN CLAY. See Clay.

PORCUPINE (Lat. *porcus*, a hog, and *spina*, a thorn or spine), the common name of the sub-families *cercolabina* and *hystricina*, the most highly organized and widely distributed of the rodent family of *hystricidæ*. The former is confined to America, and the latter is spread over the old world. In both sub-families the clavicles are nearly perfect, attached to the sternum but not to the scapula; the infraorbital foramina are very large; the frontals very broad; the malar bones destitute of an angular process on the lower margin; the molars $\frac{4-4}{4-4}$; the dorsal vertebræ usually 14, and the lumbar 4; feet short; body more or less armed with spines or quills, capable of erection by the subcutaneous muscles.—The *cercolabina* live almost entirely in trees, and their feet have generally only 4 nearly equal toes, with long, compressed, and curved claws; there are sometimes 5 toes on the hind feet; the soles are thickly studded with small flattened warts; the skull short and broad, with a minute lachrymal bone forming no part of the lachrymal canal; the palate between the molars is on a lower level than the anterior portion; the molars converge in front, and are distinctly rooted, each having a fold of enamel on either side, the worn crown presenting 2 deep transverse cavities surrounded by enamel; incisors small: anterior and posterior clinoid processes wanting. This sub-family contains the genera *erethizon* (F. Cuv.), *cercolabes* (Brandt), and *chætomys* (Gray). The genus *erethizon* has a non-prehensile tail, short, thick, flattened, covered at the base above with hairs and spines, and on the under side and at the apex with stiff bristles; nostrils close together; feet short and broad: toes 4 or 5, with long curved claws; hind feet with a distinct inner toe with claw, without any projecting semicircular lobe on the inner side; upper lip slightly notched, but with no naked mesial line; body stout and covered with a long and dense fur from which the spines project; limbs short and strong. The best known species is the Canada porcupine (*E. dorsatus*, F. Cuv.), about 2½ feet long, weighing from 20 to 30 lbs.; it appears larger than it really is from the length of the hair and spines; the fur is generally dark brown, soft, woolly, and grayish next the skin, coarse and bristly in some parts, 6 or 7 inches long on the back, the coarse hairs usually with dirty white points, giving to the whole a hoary tint; the spines, more or less hidden by the fur, and abundant on the upper surface of the head, body, and tail, are 2 or 3 inches long, white with dark points; the tail is about 10 inches additional to the above length; the incisors deep orange. It is a very clumsy animal, with back much arched, snout thick and tumid, ears short and round, and tongue rough with scales. It is found between northern Pennsylvania and lat. 67° N., and to the E. of the upper Missouri river. It is an excellent though a slow climber; it is not able to escape its enemies by flight, but cannot be attacked even by the largest carnivora with impunity; dogs, wolves, the lynx, and the cougar have been known to die from the inflammation produced by its quills; these are loosely attached to the skin and barbed at the point, so that they easily penetrate, retain their hold, and tend continually to become more deeply inserted; when irritated it erects its quills, and by a quick lateral movement of the tail strikes its enemy, leaving the nose, mouth, and tongue beset with its darts; it has no power of shooting the quills. The food consists of vegetable substances, especially the inner bark and tender twigs of the elm, basswood, and hemlock; it seldom quits a tree while the bark is uneaten, except in cold weather, when it descends to sleep in a hollow stump or cave; as it kills the trees which it ascends, its depredations are often serious. The nest is made in a hollow tree, and the young, generally two, are born in April or May. It is almost as large as a beaver, and is eagerly hunted by the Indians, who eat the flesh, and use the quills to ornament their moccasons, belts, pouches, bags, baskets, and canoes, for which purpose they are often dyed with bright colors; it is very tenacious of life; it does not hibernate, as the European porcupine is said to do. This animal shows admirably that the quills are only modified hairs, as it presents quills on the back, spiny hairs on the sides, and coarse bristly hairs on the under surface, passing into each other in regular gradation. The yellow-haired porcupine (*E. epixanthus*, Brandt) is smaller than the preceding; the color is blackish brown, the long hairs of the body tipped with greenish yellow; the anterior molar, as in the other, is considerably larger than the rest; it is found W. of the Missouri to the Pacific ocean.—In the genus *cercolabes*, which includes the tree porcupines, the body is similarly armed with spines and spiny hairs; the tail is long and prehensile; all the feet 4-toed, with long and curved nails, the hind feet having each a rudimentary inner one, a small nailless tubercle, and being with the palm much expanded by a semicircular lobe on the inner side; the soles are rough and naked, the claws long, and the hind feet so articulated that the soles are directed inward; the lobe can be bent inward, being supported by several bones, some supernumerary; the tail is thick and muscular at the base, slender and bare above and prehensile at the end, the upper surface being applied to the branches, and the tail coiled in a direction opposite to that of the monkeys of the same country. The muzzle is very movable, hairy, thick, and obliquely truncated; the eyes small but prominent; ears small and sparingly clothed with hair; the incisors are narrow. They emit a disagreeable odor, somewhat like that of garlic; the food consists of fruits, leaves, and tender bark; they are usually seen singly, and sleep during the heat of the day, feeding at morning and evening; they are harmless, easily reconciled to captivity, but with very little intelligence. They inhabit America, from Mexico to Paraguay, living on trees, on which they are expert but slow climbers. The Brazilian tree porcupine (*C. prehensilis*, Brandt) is 16 to 20 inches to the base of tail, the latter nearly as much more. It is abundant in Guiana, Brazil, and Bolivia, and feeds on the fruit of the palms. In the Mexican tree porcupine (*C. Novæ Hispaniæ*, Briss.) the general color is black; the spines are nearly all hidden by the fur, yellowish or whitish with black points; it is about 18 inches long, with a tail of 14; it inhabits the temperate mountain regions of eastern Mexico, between 2,000 and 4,000 feet above the sea. Other species are described in vol. ii. of Waterhouse's "Natural History of the Mammalia" (London, 1848). Dr. Lund describes from the caves of Minas Geraes in Brazil two species of fossil tree porcupines, one of which he believes to have been as large as the peccary.—The sub-family *hystricinæ*, or the old world porcupines, dwell on the ground, living in burrows or caves in the rocks; they have 5 toes on all the feet, and the soles are naked and smooth; the skull is elongated, with a distinct lachrymal bone partly enclosing the lachrymal opening; molars semi-rooted and in parallel series, those of the upper jaw with one internal fold of enamel and 3 or 4 externally, soon assuming the form of small isolated areas; lower molars with the folds reversed; the whole palate is on the same level and the ethmoid processes are distinct; the upper lip is divided by a vertical groove. They are found in S. Europe, middle and S. Asia, and Africa. In the genus *hystrix* (Linn.) the tail is short, and the hinder part of the neck is armed with long cylindrical spines or quills; the inner toe of the fore feet is very short, with a small blunt nail; there are 5 fleshy pads on the fore, and 6 on the hind soles. The crested or common porcupine (*H. cristata*, Linn.) is found in S. Europe, where it has come from N. and W. Africa; it is about 28 inches long, the tail about 8 more; the muzzle is large and obtuse, sparingly clothed with small dusky hairs, with scattered longer and coarser ones on the upper lip; anterior and under parts and limbs with spines not more than 2 inches long, with which are mixed some coarse hairs; crest of numerous very long bristles, extending from the crown to the back, some 16 inches long, and curving backward; hind parts of the body and tail covered with quills, some slender and flexible, 12 to 16 inches long, others shorter, stouter, and very sharp; a few on the tip of the tail are hollow, generally open and truncated at the end, and supported on a very slender stalk about ¼ inch long. The prevailing color is brownish black, with a white band on the fore part of the neck; the longest quills have the terminal 5th white, and the rest variously ringed black and white; bristles of crest dusky with long white points, some all dirty white; feet black; the quills vary considerably in color, but are generally grooved with several delicate longitudinal channels. The skull may be at once recognized by the great size of the nasal bones, the development of the nasal cavity, and the highly arched upper surface. This is the *porc-épic* of the French, the spiny pig, so called from its heavy pig-like look and its grunting voice. It lives in rocky crevices or in burrows, becoming torpid in winter; the food consists of various vegetable substances, and its flesh is well flavored; it can erect its quills at pleasure, but cannot discharge them; beside its grunts, it makes a rattling noise by shaking the tuft of hollow quills on the tail; it also strikes the ground with its feet like the hares. The Nepaul porcupine (*H. Hodgsoni*, Gray) has no crest, and is covered chiefly with spiny bristles with long hair-like points, and the quills are rather black than white; it is very abundant in the sub-Himalayan region, and very mischievous, digging up potatoes and other tuberous and root crops; it is monogamous, and has 2 at a birth; the flesh is very delicate, and is eaten by all classes, even by the high caste Hindoos, according to Hodgson; it is easily tamed and breeds in captivity, and it is considered lucky to have a family about stables. Fossil bones of this genus have been found in Italy and India.

PORCUPINE ANT-EATER, the popular name of the *echidna* (Cuv.), a genus of marsupial mammals of the section *monotremata*, inhabiting Australia and Tasmania. The snout is long, slender, and naked, and the tongue protractile, very long, and slender, as in the ant-eaters proper; the opening of the mouth small; the upper part of the body covered with spines and hairs intermixed; legs short and powerful; all the feet with 5 well developed toes with large nails, the fore feet formed for burrowing, and the hind feet in the male with a horny spur as in the ornithorhynchus; tail very short and hidden by the spines. The best known species, the *E. aculeata* (Shaw), is about a foot long, with a stout body, spiny above, and the head, limbs, and lower parts with brownish black coarse hair; inner toe of the hind feet with a broad rounded nail, the others with long curved claws, that of the 2d very long. It is considerably larger than the common hedgehog, is powerfully built, and especially adapted for burrowing. The food consists of ants and other small insects, which it captures like the ant-eaters with its tongue, by means of a viscid matter secreted by 2 large submaxillary glands extending from behind the ear to the fore part of the chest; there are no teeth in the jaws, but the palate is armed with several rows of horny spines directed backward, and the upper surface of the tongue is furnished with numerous small corneous warts. The skull in shape has been compared to the half of a pear cut lengthwise, being 4 inches long by 1¾ wide at the posterior portion, ending in a point anteriorly; nostrils near the end of snout; eyes small and black; ear cavity in the form of a long tube, with its S-shaped opening on the back of the head. The spines are dirty white tipped with black, sharp, about 1¾ inches long, directed backward, and on the back inward, crossing each other on the mesial line. The hind feet in the natural position rest on their inner side, the concave surface looking outward, thus keeping the claws unworn for casting aside the earth loosened by the fore claws. In captivity it is a stupid creature, slow-moving, avoiding the light, and active only in burrowing, which it does with astonishing rapidity; specimens have been kept alive at the London zoological gardens, where they were fed on bread and milk; when irritated or asleep they roll themselves in a ball, the head between the fore legs. It can sink into loose sand directly downward, presenting only its spiny back to its enemies; in spite of its defensive armor it often falls a prey to the thylacine and other carnivorous marsupials. Its common name is inappropriate, as it is neither a rodent like the porcupine nor an edentate proper like the ant-eater, though it has the spiny covering of the one and the toothless jaws of the other; in some districts it is called the hedgehog, which is equally inapplicable, as the dentition of the insectivora is not represented in this animal; perhaps, however, the name here given, originally imposed by Shaw, is the best that could be selected. It is now rather rare in the colony. The *E. setosa* (Cuv.) has the fur so long as nearly to hide the shorter spines; the general color is brown, paler on the head and below; the length is from 14 to 17 inches; it is peculiar to Tasmania, and perhaps is only a variety of the other species, arising from living in a moister climate, which would tend to develop the hair and check the growth of the spines.

PORGY. See Scuppaug.

PORISM, a geometric proposition used by the ancient mathematicians, having for its ob-ot to find the conditions that will render rtain problems indeterminate or capable of numerable solutions. It is intermediate between the problem, in which something is prosed to be constructed, and the theorem, hich is something requiring demonstration. e recovery of this branch of the ancient analyis due to Prof. R. Simson, who deduced it om the imperfect mathematical work of Paps (1732). His restoration of Euclid's "Posms" was published after his death in 1776.

POROSITY (Gr. πόρος, a passage), the contion of open structure in which the particles matter are arranged in all bodies, leaving tween them pores or interstices that are supsed to be vacant or filled with air. The extence of such spaces even in the most solid dies is proved in various ways. When wood stone of the most compact structure is imersed in water under the receiver of an air mp and the air is exhausted from the surface, at contained in these bodies immediately akes its appearance rising from them in a ood of bubbles. Under great pressure water forced through the pores of cast iron, even 4 inches thickness. (See CANNON, and IRON, ol. ix. p. 590.) The porosity of this material evidently increased by dissolving out the rbon that is disseminated throughout its subance, by which it becomes malleable iron ithout change of form, but the change of xture thus indicated is not apparent to the ye. Density, which is the opposite condition porosity, is increased in most metals by presure and hammering. The molecules are thus rought into closer contact, and the body is und to possess greater specific gravity and trength. Liquids are also supposed to be orous from the fact that mixtures are someimes made which occupy less space than the um of the volumes of the ingredients when eparated. This is the case with alcohol and ater. Specific gravity, expressing the relaive weights or densities of bodies, also defines n inverse ratio their porosity.

PORPHYRY (Gr. πορφύρα, purple), a rock named from the prevalent color of the varieties used by the ancients, as the *rosso antico*, r red porphyry of Egypt. This variety consts of a ground or paste of reddish feldspar in hich are disseminated rose-colored crystals f the feldspar called oligoclase, with some lates of blackish hornblende and grains of perxide of iron. This in general is the character f porphyry; but the paste may be green, red, rple, or black, and the interspersed crystals ay present various shades, usually however ghter than the ground. They may be also of rnblende, quartz, augite, olivine, and other inerals. The rock is very hard and susceptible f a fine polish. Upon the smooth surface the ystals appear as blotches. Various rocks of n earthy or compact base with distinct interpersed crystals are termed porphyritic. Granite so called when it presents distinct feldspar ystals, and so is greenstone, trachyte, &c. The principal uses of porphyry are in architecture and ornamental articles, as vases, slabs, &c. No material is more durable, and none retains better the sharp lines and high polish which it receives. In modern times it is most successfully worked by the Swedes and Russians. Blocks for vases, after being chiselled nearly into shape, are turned in lathes, and worn down by the application of lumps of porphyry and emery and water. In the Swedish royal porphyry works of Dalecarlia vases, tazze, &c., of immense size are made, one of the latter exceeding 11 feet in diameter. A vase of pink granitoid porphyry 6 feet high and 4 feet 4 inches in diameter was sent to the great exhibition in London in 1851. Slabs of porphyry are employed in the arts with mullers of the same materials for grinding hard powdered substances to extreme fineness, and the process is thence termed porphyrization. In the United States porphyry is met with in granitic regions, and in general is found along the range of the veins of valuable metals in such regions.

PORPHYRY (Gr. Πορφύριος, *i. e.*, a wearer of purple), a philosopher of the Neo-Platonic school, born in Tyre, A. D. 233, died in Rome about 305. Some have supposed that he was of Jewish origin, but others that he falsely so asserted in order to obtain the more respect for his statements in relation to the Jewish Scriptures. He was a man of distinguished family, named Malchus, the Greek form of the Syro-Phœnician Moloch, signifying king; but he received from his preceptor Longinus, in allusion to the signification of this original title, the name by which he has ever since been known. He studied under Origen at Cæsarea, under Apollonius and Longinus at Athens, and at Rome under Plotinus, with whom he remained 6 years, at the end of which period he went to Sicily by the advice of his master, who had become aware that the pupil entertained the idea of suicide. While in Sicily he wrote his treatise against the Christian religion. He subsequently returned to Rome, and taught there for many years. The philosophical doctrines of Porphyry were essentially those of Plotinus. He insisted strongly on the contrast between the corporeal and the incorporeal, and the power of the latter over the former. The influence of the incorporeal was, in his view, unrestricted by the limits of space and independent of the accident of contiguity. When free from the intermixture of matter it is omnipresent and its power unlimited. The worship of the national gods of a people seems to have been upheld by him, on the ground that respect should be shown to the ancient religious usages of a nation; but he acknowledged one absolute supreme Deity, who is to be worshipped with pure words and thoughts. There are extant 19 different works of Porphyry, in whole or in part, mostly on the Neo-Platonic doctrines, and 21 are mentioned as lost. The most celebrated of the latter was his work "Against the Christians," which was publicly destroyed by order of the emperor

Theodosius. It was in 15 books, and treated both the Jewish and Christian Scriptures very minutely. In it he admits the wisdom of Christ, but asserts that the Christians had perverted what Christ originally taught.

PORPOISE, the common name of the small-sized cetacean mammals of the genus *phocæna* (Cuv.). The snout is short, uniformly rounded, wide from the breadth of the more horizontal intermaxillaries and maxillaries, without the prolonged beak, separated from the forehead by a distinct furrow, which characterizes the dolphin, to which family it also belongs. The name is evidently a corruption of the French *porc-poisson* (hog fish); it is called *Meerschwein* by the Germans, *marsouin* by the French, and sea hog and puffing pig by the English and Americans. Though an air-breathing mammal and not a fish, the shape of the body is fish-like and adapted for progression in the water; the jaws are armed with minute conical teeth; the blow-hole, on the top of the head, is transverse, crescentic, with the concavity forward. (For its anatomy see DOLPHIN.) There are several species in different parts of the world, some of which have a very wide geographical distribution; they are very active, living in shoals or flocks, and are frequently seen swimming and playing about vessels, running races with them, and leaping out of water in their sports; their food consists chiefly of fishes and cephalopod mollusks; their flesh is dark-colored and gorged with blood, and was once considered a delicacy, and is now often eaten by sailors; their blubber yields a very fine oil, and their skin makes an excellent leather. The common porpoise (*P. communis*, Cuv.) is from 4 to 6 feet long, bluish black above with violet or greenish reflections, and white beneath; a little behind the middle of the back is a triangular cutaneous fold or dorsal fin; teeth 20 to 24 on each side in both jaws, compressed laterally, and curved somewhat backward; the lower jaw the longer; the pupil is V-shaped reversed, and the tongue festooned all round; the skin is smooth, perfectly destitute of hair, and even of eyelashes, and beneath it is a layer of fat about an inch thick; there are no lips, and the small eyes are nearly in a line with the opening of the mouth; the opening of the ear is exceedingly small; neither the dorsal fin nor the tail has any internal bones, and the former consists of fat and is incapable of motion; the pectorals are brownish, though arising from a white part of the body; the brain is large, with numerous and deep convolutions over the cerebellum. There are 4 stomachs, and even 6 if all the constricted portions be counted as such; the walls of the 1st are strongly wrinkled, of the 2d very thick with longitudinal wrinkles of a pulpy consistence, the 3d membranous with numerous small pores, and the 4th wrinkled like the 1st; the intestine grows smaller to the anus, and the cæcum is absent. Gestation continues 6 months, and a single young one is produced at a birth, about 20 inches long, which is suckled and protected by the mother, as in other mammals; it can provide for itself at a year old. This species is common all about the coasts of Europe, extending even to the icy seas; they generally keep near the shores, where they root about with their snouts like hogs; they are often seen rolling and tumbling in the water, as they rise to the surface to breathe with a puffing sound; they look in the water like large black pigs, whence their common names. They pursue herrings, mackerel, salmon, and other fishes which swim in shoals, sometimes going far up rivers in the eagerness of their pursuit; they have been seen in the Thames at London, and in the Seine at Rouen and even at Paris. The common porpoise of the American coast, formerly considered the same as the *P. communis* of Europe, was described as distinct by Prof. Agassiz in 1850, under the name of *P. Americana*. In size and color the two species are very much alike; the general form of the skull is different, the posterior surface in the European species being nearly vertical, but much curved in the American; the teeth of the latter are divided on the broad faces near the summit by grooves almost into 3 lobes, those of the former being smooth; the dorsal fin in the American is serrated and furnished with very characteristic tubercles, which are not mentioned in the descriptions of the European; the temporal groove of the skull is as wide as long in *P. Americana*, but narrower and oblong in *P. communis*. This species is common on our coast, chiefly in spring and summer, appearing in pursuit of the herring and other migratory fish; it should not be confounded with the cetacean called the sea porpoise, a true dolphin, and only seen off soundings. It was in former years captured in great numbers near the E. end of Long island in large seines from which they were harpooned and dragged on shore; from the blubber of each animal about 6 gallons of oil are obtained. The Cape porpoise (*P. Capensis*, Duss.) is from 4 to 6 feet long, almost wholly black, with rather small pectorals; it is found about the Cape of Good Hope. The striped porpoise (*P. bivittata*, Less.), of the southern seas, has a short conical snout, and a moderately high, black dorsal fin in the middle of the body; the form is slender, the length being about 3 feet, and the thickness 10 inches; the upper half of the body is of a shining black color, the lower jaw and under parts white; the black of the sides has a white stripe from the snout to the tail, interrupted opposite the dorsal fin; the tail is brown, and the pectorals white with the anterior edge black. This is one of the handsomest of cetaceans.

PORPORA, NICOLO, an Italian composer, born in Naples in 1687, died there in 1767. He was instructed by Scarlatti, and first brought himself into notice at Vienna, where he gained the approbation of the emperor Charles VI. In 1726 he entered upon a career of great success at Venice, and thence proceeded to Dreson, successfully opposing the composer Hasse. In 1751 he returned to Naples and established a school of vocalism, in which were educated some of the most celebrated singers of the 18th century, including Farinelli, Caffarelli, and Gizziello. In 1733 he was engaged by a party opposed to Handel to direct a rival opera in London; but, although supported by Farinelli, he failed to make any impression, and returned to Italy so disheartened that for some years he refrained from composing. About 1750 he established himself in Vienna, where Haydn came under his influence; and subsequently he became principal master at the Incurabili conservatory in Venice. Late in life he retired to Naples, where he died in indigence. His works, comprising 50 operas and a great number of masses, cantatas, sonatas, &c., are distinguished by gravity and elevation of style. His character and some passages of his life are graphically sketched in George Sand's novel "Consuelo."

PORSENA, or **Porsenna**, **Lars**, a king of Clusium in Etruria, to whom, according to the legend, the Tarquins in the 2d year after their expulsion from Rome applied for assistance in recovering their kingdom. Porsena immediately marched with an Etruscan army to the fortified hill Janiculum, and on his appearance the Romans fled to the Tiber and to the Sublician bridge, apparently without striking a blow. The defence of the bridge was intrusted to Horatius Cocles, who held the Etruscans in check at one end while the bridge was broken down behind him, and then swam the river safely. Porsena now besieged the city, but having learned from C. Mucius Scævola after the siege had lasted for some time, that 300 noble Romans had bound themselves by an oath to kill him, he made peace upon the reception of hostages, and retired to Clusium. This legend is believed by critics to veil the fact of a short subjugation of Rome by the Etruscans, which is implied by Tacitus, Pliny, and other classical writers.

PORSON, **Richard**, an English scholar and critic, born in East Ruston, Norfolk, Dec. 25, 1759, died in London, Sept. 25, 1808. At the age of 9 he was sent to a village school at Happisburgh, where he remained 3 years. His father, who was parish clerk of East Ruston, required him to repeat every night all the lessons that he had gone through during the day; and to this early exercise of his memory may perhaps be attributed that retentive power for which it afterward became remarkable. He received some instruction gratuitously from the Rev. Charles Hewitt, and when 15 years of age was sent to Eton at the expense of some gentlemen of the neighborhood. He then knew by heart nearly the whole of Horace and Virgil, the Iliad, the Odyssey, and many parts of Cicero and Livy; and in his own opinion he acquired little at Eton but facility in Latin versification. In 1777, principally by the assistance of Sir George Baker, president of the royal college of physicians, he entered Trinity college, Cambridge, where he obtained a fellowship in 1781, and was graduated M.A. in 1785. In 1793 he was made regius professor of Greek in the university. The salary of this office was only £40 a year. Some conscientious scruples deterred him from subscribing to the 39 articles of the church of England, and as it was thus impossible for him to enter into holy orders he vacated his fellowship in accordance with the rules of the college, and it is said that he lived in London on a guinea a month. In 1792 a number of his friends subscribed the sum of £2,000, which was so invested as to give him for the rest of his life an income of £100 per annum; and on the establishment of the London institution, he was appointed head librarian, with a salary of £200. Sedentary and irregular habits had broken his constitution, and during the latter years of his life he was subject to a painful asthmatic disease, and was in general ill health. His first attempts as an author were made in Dr. Maty's "Review," as early as 1783, and consisted of articles on Æschylus, Brunck's Aristophanes, Weston's Hermesianax, and other subjects. In 1786 he added some notes to an edition of Xenophon's Anabasis, and in 1790 published notes on *Toupii Emendationes in Suidam*. He first appeared as an author in his own name in the letters to Archdeacon Travis upon the contested verse 1 John v. 7, entitled "Letters on the Three Witnesses" (1790). He contributed several critical articles to the "Monthly Review," added notes to the London edition of Heyne's Virgil, corrected the text of Æschylus for the Glasgow edition, prepared an edition of the *Hecuba*, *Orestes*, *Phœnissæ*, and *Medea* of Euripides; collated the Harleian manuscript of the Odyssey for the Grenville Homer, and added notes, and corrected the edition of Herodotus printed at Edinburgh in 1806. He bestowed considerable pains on the restoration of the Greek text of the Rosetta stone. His *Notæ in Aristophanem* and *Lectiones Platonicæ* were published in 1820. The work entitled *Adversaria* was arranged after Porson's death from memoranda found among his papers.—Porson is generally considered one of the greatest classical scholars of modern times, and without a rival as a sound, accurate, and refined Greek critic. He was singularly acute and cautious, and to the highest degree of patience and perseverance united excellent judgment. His memory was almost miraculous. He was familiar with the whole body of Greek literature, thoroughly versed in the standard works of French literature, and well read in the English classics. His recollection of the very words, in long passages of prose as well as verse, in English authors, was astonishing. The best founded complaint made against Porson is, that with his great capabilities he did so little. A very large sum was offered him for an edition of Aristophanes, but he would not undertake the work, though in the opinion of those qualified to judge it would not have occupied him more than 6 months. He has been described as an habitual drunkard, but apparently without truth, though he drank, and at times even to intoxication.—See "Life of Richard Porson, M.A.," by the Rev. John Selby Watson, M.A. (8vo., London, 1861).

PORT AU PRINCE, or PORT REPUBLICAIN, the capital of Hayti, situated on the W. coast, at the head of a bay of the same name; pop. estimated at 30,000. It is built on ground which rises gradually, and has a very attractive appearance from the sea; but on entering the streets it is found to be very filthy. The houses are generally of two stories, constructed slightly of wood, as best calculated to withstand the effects of earthquakes, which at different times have nearly destroyed the city, more particularly in 1751 and 1770. A few of the houses are built of stone or brick. The most important public edifices are the palace and the senate house. There is a Roman Catholic church, a lyceum, college, custom house, mint, and hospital. The ground in the vicinity is marshy, and the climate is unhealthy. The harbor is perfectly safe except between August and November, when hurricanes occur. A considerable trade is carried on, the principal exports being mahogany, logwood, honey, coffee, cocoa, and rags; and the imports manufactured goods, provisions, and lumber. During the year 1857–'8, 83 vessels under the U. S. flag entered the port with cargoes valued at $927,904, and sailed with return cargoes estimated at $10,961,836. The town has suffered severely from fire at different times, but more especially in the years 1784, 1820, 1822, and 1850.

PORT CARBON, a town of Schuylkill co., Penn., on the Schuylkill river at the mouth of Mill creek, 3 m. N. E. from Pottsville; pop. in 1860, 2,006. It is in the midst of a rich and extensive coal region, from which nearly its entire support is derived. It carries on an active trade in coal by means of the Schuylkill valley railroad and the Schuylkill navigation, of which it is the terminus. In 1829 there was but one house on the present site. Its progress was rapid for many years, but it seems to have reached its limits, not having increased in population for more than 10 years.

PORT ELIZABETH, a free port of Cape Colony, S. Africa, on the W. shore of Algoa bay; pop. in 1851, about 4,500. In 1855, 163 vessels, measuring 26,914 tons, entered the harbor; the total value of imports in the same year was £376,638, and of exports £584,447. A considerable trade is rising between Boston, Mass., and Port Elizabeth, *via* Cape Town; the chief imports being tobacco, provisions, flour, shoes, farming implements, and some cotton goods, beside an innumerable assortment of trifling manufactured articles. During the 9 months ending Sept. 30, 1857, the value of the imports from the United States amounted to $157,797, and the exports to the same, which consisted of raw produce, to $462,865.

PORT LOUIS, the capital of the island of Mauritius, situated near its N. W. extremity, at the head of a triangular bay; pop. about [illegible] It is well protected to seaward by forts, and by a strong citadel which commands all approaches. The town is open to the ocean on one side, and on the other sides enclosed by picturesque mountains. The fashionable resorts are Government street and the ground around the Champ de Mars; the latter is a beautiful semi-circular plain, used as a parade ground for the garrison, and a race course. Formerly the houses of Port Louis were entirely constructed of timber; but, in consequence of many destructive fires, a law has been in force for some years past to prevent the erection of wooden dwellings. The government house, barracks, and many other large buildings, erected by the French, are still in excellent preservation. A dry dock was opened in 1859, capable of taking in a vessel [illegible] feet long; it is 80 feet wide at the top and [illegible] at bottom, and has 23 feet water on the sill at high tide. Two lighthouses have been completed, the main light on Flat island, with a subsidiary one on Cannonier point. There are several churches and schools, a theatre, and the usual government and public buildings.

PORT MAHON, the capital of the island of Minorca, situated 2 m. from the mouth of a bay a league in extent, in lat 39° 52′ N. and long. 4° 20′ E.; pop. 13,280. The city is of modern construction, and contains some fine public buildings and several schools and charitable institutions. Many of the houses are built on ledges of rock projecting over the sea. They are usually of stone, and have a neat and attractive appearance. The bay forms the finest harbor in the Mediterranean. It extends about 5 m. inland, having a narrow entrance between ledges of rock. It is defended by batteries mounting heavy guns. Manufactures and trade are decaying.

PORT ROYAL, a convent of Cistercian nuns near Versailles, which gained a world-wide celebrity in the history of the Jansenist controversy. The influence of the Jansenist doctrines on the nuns commenced when the first leader of the French Jansenists, the gifted abbé de St. Cyran, became their confessor. The abbess, Angélique Arnauld, in particular, became an enthusiastic admirer of the system. With her, the entire influential family of the Arnaulds, whose hereditary opposition to the Jesuits was said to be their second "original sin," was gained. Angélique was a daughter of Antoine Arnauld, an eminent advocate, and after his death (1626) his wife and several of his daughters entered Port Royal, and soon 5 daughters of his eldest son Robert followed their example. Some of the male members of the family organized a religious community in the neighborhood of the nuns; among them were Antoine Lemaître, a grandson of Antoine Arnauld, and one of the most illustrious orators of his time, who renounced a brilliant ca-year in order to do penance under the guidance of St. Cyran; Simon Séricourt (1638), Isaac de Sacy, Robert Arnauld (after the death of his wife), and the youngest brother of the latter, Dr. Antoine Arnauld, who by his impetuous eloquence and his astonishing learning subsequently became the head of the French Jansenists. All these occupied Port Royal, when the nuns in 1638 removed to a convent in Paris, and they were soon joined by Singlin, who after the death of St. Cyran became the confessor of the nuns, the physician Hamon, the dukes of Luynes and Liancourt, and others. Pascal, Nicole, and Lancelot maintained intimate relations with them; Boileau was their friend, and Racine, who wrote a history of Port Royal, was their pupil. The mode of life in Port Royal was distinguished for austerity. They rose at 3 o'clock in the morning; after the common morning prayer they kissed the ground, as a sign of their self-humiliation before God. Then they read, kneeling, a chapter from the Gospels, and one from the Epistles, and concluded with another prayer. Two hours in the morning and two in the afternoon were devoted to manual labor in the gardens adjoining the convent, and they observed with great strictness the season of Lent. The teaching of Port Royal obtained a wide celebrity under the guidance of Lancelot, and its boarding schools were resorted to by pupils from all parts of France. Their fame was in all mouths, but Cardinal Richelieu subjected them to a judicial investigation in 1638 and imprisoned the abbé de St. Cyran. After the death of Richelieu (1642), St. Cyran regained his liberty, but soon died, prophesying that for the contest against the Jesuits, the chief opponents of Jansenism, he would leave 20 disciples stronger than himself. In the same year Dr. Antoine Arnauld, by his treatise *De la fréquente communion*, charging the Jesuits with admitting people of the world without due preparation to the Lord's supper, opened the war between Port Royal and the Jesuits, which was only to end with the suppression of the former. The contest soon assumed a political character, the Jesuits having the government on their side, and generally also the Sorbonne, while Port Royal was supported by the parliament, and by a few illustrious personages, among whom was the duchess of Longueville, who established herself in the vicinity of the convent. The recluses of Port Royal remained the leaders and the centre of the opposition to the papal efforts for the suppression of Jansenism, and the nuns consistently refused to subscribe to the condemnatory decrees, except once, in 1665, when the advocates of Jansenism had secured a kind of compromise. Singularly enough, it was the bold defence of the rights of the popes on the part of two Jansenist bishops against the despotic caprices of Louis XIV., which led to the scattering of the community, the heads of whom, Arnauld and Nicole, had to flee from France. The nuns, some of whom had previously returned from Paris to Port Royal, were forbidden to receive novices, but kept up their resistance to the decrees against Jansenism until 1709, when a royal ordinance decreed the suppression of both their convents, that of Paris and the original Port Royal (Port Royal des Champs), and the distribution of the nuns among different convents of other dioceses. As its history was so closely interwoven with that of Jansenism, the monastic community of Port Royal has never been revived.—Several distinguished historians have written the history of this most celebrated of all monastic establishments; among them the best and most recent are: Reuchlin, *Geschichte von Port Royal* (2 vols., Hamburg, 1839–'44); Ste. Beuve (the descendant of a Jansenist family), *Port Royal* (2 vols., Paris, 1840–'42); Beard, "Port Royal, a Contribution to the History of Religion and Literature in France" (2 vols. 8vo., London, 1861).

PORT WINE, a Portuguese wine produced in the vicinity of Oporto on the Douro. The principal vineyards are in the mountainous districts called the Alto-Douro, about 15 leagues from the city, where the vines are cultivated in terraces, and not suffered to grow higher than 8½ feet. The vintage begins in September and lasts about a month. The juice, having been pressed from the grapes by the treading process, is placed in casks to ferment, and then transferred to large vats where a second fermentation ensues. In the winter it is racked into pipes and conveyed to Oporto. The wines produced are of various qualities, but those intended for exportation are submitted to inspectors, who permit none but a strong, dark, sweet kind to leave the country. Hence, it is said, the best wines are kept at home, and the exported wines are generally adulterated to a large extent to give them the prescribed strength and color. Brandy is added to them when they are deposited in the stores, and again when they are shipped, which is in most cases about a year after the vintage. When white grapes have been largely used instead of black, elder berries or some other coloring substances are added. The exported wine should remain several years in the wood in order to abate its sweet and astringent flavor, but the aroma of the grape does not entirely overcome the taste and odor of brandy until it has been 10 or 15 years in bottle. The average yield of the Alto-Douro district, until the vine disease made its appearance about 1854, was not far from 105,000 pipes, or rather more than one pipe per acre, one half of which was declared fit for exportation. In 1856–'7 the wine shipped from the Douro amounted to 35,264 pipes, in 1857–'8 to 19,212, and in 1858–'9 to 17,597. Much the larger part of this is sent to England.

PORTA, Baccio della. See Baccio.

PORTA, Giambattista, an Italian natural philosopher, born in Naples about 1550, died there, Feb. 4, 1615. In his zeal for the advancement of science he opened his house to a society of literary men called *i secreti*, whose meetings were finally prohibited by the court of Rome, on the supposition that magic and other unlawful secrets were discussed at them. He travelled extensively over Europe, liberally aiding the establishment of private schools for the study of particular sciences and of public academies. Late in life he wrote dramas which are now forgotten. His investigations, though in themselves incomplete and frequently absurd, have proved of great value to subsequent philosophers. The theory of light is much indebted to his labors, and he was the inventor of the camera obscura and other optical instruments, including, it was formerly supposed, the telescope. He was a voluminous writer on a great variety of subjects, including natural magic, the art of secret writing, human physiognomy, landscape gardening, optics, curvilinear geometry, chemistry, meteorology, &c. His chief work, *De Humana Physiognomia* (fol., Naples, 1598), entitles him to be considered the true founder of physiognomy.

PORTAGE. I. A N. E. co. of Ohio, drained by Cuyahoga and Mahoning rivers; area, 500 sq. m.; pop. in 1860, 24,206. It has a nearly level surface and a fertile soil. The productions in 1850 were 264,171 bushels of Indian corn, 187,147 of wheat, 162,828 of oats, 46,189 tons of hay, 295,069 lbs. of wool, and 662,614 of butter. There were 12 grist mills, 18 saw mills, 3 iron founderies, 5 woollen factories, 12 tanneries, 4 newspaper offices, 60 churches, and 11,024 pupils attending public schools. It is intersected by the Pennsylvania and Ohio canal, and by the Cleveland and Mahoning and Cleveland and Pittsburg railroads, the latter of which passes through the capital, Ravenna. II. A central co. of Wis., intersected by Wisconsin river and drained by several of its branches; area, 1,650 sq. m.; pop. in 1860, 7,509. It contains extensive pine forests, from which large quantities of lumber are rafted down the river. Capital, Plover.

PORTAGE CITY, a village and the capital of Columbia co., Wis., on the Wisconsin river, about 100 m. from its source, and on the La Crosse and Milwaukee railroad, 95 m. N. W. from Milwaukee and 105 m. E. S. E. from La Crosse; pop. in 1860, 2,950. At this point the Wisconsin river is connected with the Fox by means of the Fox and Wisconsin river improvement, which here furnishes abundant water power, as well as an outlet eastward through Green bay for the produce of the interior, and southward by the Mississippi for large quantities of manufactured lumber from N. E. Wisconsin. Railways will soon be completed from Portage to Madison, 36 m. S., and Columbus, 27 m. S. E. The principal manufactures are lumber, flour, brick, and pottery, and there are two large breweries, a foundery, and several smaller manufactories. There are 5 churches, Baptist, Episcopalian, Methodist, Presbyterian, and Roman Catholic.

PORTALIS, JEAN ÉTIENNE MARIE, a French lawyer and statesman, born in Beausset, Provence, in 1746, died in 1807. He was admitted as an advocate by the parliament of Aix at the age of 21. His memorial "On the Validity of Protestant Marriages in France" (1770) first made him known beyond his department, and his conduct of cases against Mirabeau and Beaumarchais gave him an extended reputation. Upon the breaking out of the revolution he fled to Lyons, but in 1793 went to Paris, where he was arrested and imprisoned, and only obtained his liberty upon the fall of Robespierre. In 1795 he was a member of the council of the ancients, and opposed the directory. He was proscribed on the 18th Fructidor (1797) and took refuge in Germany, whence he returned in 1800. In 1801 he was made a councillor of state, and assisted in the preparation of the civil code; and in the same year he became minister of public worship, and in 1803 a senator. He was the author of a *Traité sur l'usage et l'abus de l'esprit philosophique, pendant le XVIIIe siècle.*—JOSEPH MARIE, count, a French statesman, son of the preceding, born in Aix, Bouches-du-Rhône, Feb. 19, 1778. Having obtained a diplomatic appointment, he took part in the negotiations which ended in the peace of Amiens, and was for some time minister plenipotentiary at Ratisbon. When his father became minister of public worship he was made secretary-general of that department. In 1810 he was made councillor of state and censor of the press. When the trouble occurred between Napoleon I. and the pope, the relations of Portalis with the abbé d'Astros excited the emperor's displeasure, and he was banished from Paris. Two years later he was made president of the imperial court at Angers. Upon the first restoration he was confirmed in the position and made councillor of state, and during the Hundred Days he again attached himself to the emperor. After the battle of Waterloo he once more obtained the royal favor, and in 1816 was made a councillor of the court of cassation; in 1818 ambassador to Rome; in 1819 peer of France; in 1824 president of a chamber of the court of cassation; and subsequently minister of foreign affairs, and first president of the court of cassation. After the *coup d'état* of 1851 he was one of the commission of consultation, and in 1852 was made a senator. He is the author of a work on French literature and philosophy, prefixed to his edition of his father's work above mentioned.

PORTER, a kind of malt liquor. See BREWING.

PORTER, a N. W. co. of Ind., bordered N. by Lake Michigan and S. by the Kankakee river, and drained by Calumet river and Coffee and Salt creeks; area, about 420 sq. m.; pop. in 1850, 5,234; in 1860, 10,302. It has a nearly level surface toward the N., which becomes rough and broken in the S.; and the soil, now principally occupied by forest and prairie, is generally fertile. The productions in 1850 were 205,655 bushels of Indian corn, 70,252 of wheat, 76,143 of oats, 5,806 tons of hay, and 90,942 lbs. of wool. There were 5 grist mills, 41 churches, and 1,418 pupils attending public schools. It is intersected by the Michigan southern and northern Indiana, the Michigan central, and the Pittsburg, Fort Wayne, and Chicago railroads, the last passing through the capital, Valparaiso.

PORTER, Alexander, an American jurist, born near Omagh, county Tyrone, Ireland, in 1786, died in St. Mary's parish, La., Jan. 13, 1844. In 1801 he emigrated to the United States, and settled in Nashville, Tenn., where in 1807 he was admitted to the bar. In 1810 he removed to St. Martinsville, La., and in 1811 was elected a member of the convention which framed the first constitution of Louisiana. Before reaching the age of 30 he was one of the leading lawyers of the state, and at the same time was an extensive and successful sugar planter. In 1821 he was appointed a judge of the supreme court of Louisiana, a position which he filled for 12 years. Great confusion existed in the state in consequence of the attempt to engraft certain principles of the common law upon the mixed system of Spanish, French, and civil law which then prevailed; and to the labors of Judge Porter and his associates on the bench, Judges Matthews and Martin, is due the system of jurisprudence at present existing in Louisiana. In Dec. 1833, he resigned office, and in the same month was elected a senator in congress. In politics he was a whig, and one of his first legislative votes was recorded in favor of Mr. Clay's resolutions censuring President Jackson for removing the deposits. Subsequently he spoke in favor of the bill prohibiting the circulation in the southern states, through the mail, of publications that might excite insurrections among the slaves, and of Mr. Calhoun's motion to reject petitions for the abolition of slavery in the district of Columbia. In March, 1836, he made his most elaborate parliamentary effort in reply to a speech of Mr. Benton upon the introduction of his "expunging resolutions." He also opposed Benton's bill for compelling payments for public lands to be made in specie, and favored the division among the states of the surplus revenue remaining in the treasury at the end of each year, and the recognition of the independence of Texas. In the latter part of 1836 he resigned. In Jan. 1843, he was reelected a senator for 6 years from the ensuing March, but was prevented by ill health from taking his seat.

PORTER, Benjamin F., an American jurist, born in Charleston, S. C., in Sept. 1808. His circumstances were humble, and his education was acquired by private study. He was admitted to the bar in Charleston at an early age, afterward studied medicine, and, removing to Alabama in 1830, practised the latter profession for a short time, when he returned to the law. He was elected a member of the legislature in 1832, and in 1835 reporter of the state. In 1840 he was elevated to the bench, but resigned office soon after in consequence of some scruples as to the constitutionality of his election. He has edited 14 volumes of the Alabama reports, and translated the "Elements of the Institutes" of Heineccius. He has also contributed largely to periodicals, has been frequently an orator on public occasions, and has published among other works a collection of poems, chiefly lyrical, in Charleston.

PORTER, David, an officer of the U. S. navy, born in Boston, Mass., in Feb. 1780, died in Pera, March 28, 1843. He entered the navy in April, 1798, as a midshipman in the frigate Constellation, and was in that ship in her action with the French frigate Insurgente, Feb. 9, 1799. In Oct. 1799, he became a lieutenant, and served on the West India station in the schooner Experiment, 12. In Jan. 1800, the Experiment, while becalmed in the bight of Leogane, coast of St. Domingo, with several American merchantmen under her protection, was attacked by 10 barges well manned and armed. After a conflict of 7 hours, during which the barges went twice to the shore to land their killed and wounded, and receive reënforcements, they were beaten off. Lieut. Porter was wounded in this engagement. Subsequently the Experiment had several spirited and successful affairs with privateers, and captured the French man-of-war schooner La Diana, 14 guns and 60 men. In 1801 Porter was attached as first lieutenant to the schooner Enterprise, 12, in the Mediterranean. In Aug. 1801, the Enterprise fell in, off Malta, with a Tripolitan cruiser of 14 guns and 80 men, which, after an engagement of 3 hours, surrendered, and was taken possession of by Lieut. Porter. Subsequently, while attached to the frigate New York, he commanded a boat expedition sent to destroy several vessels in the harbor of Old Tripoli, which service was effectually performed, he receiving a severe wound. In Sept. 1803, he was attached to the frigate Philadelphia, in which ship he was captured in October of that year (see Bainbridge, William), and remained a prisoner in Tripoli until peace was proclaimed. In April, 1806, he was promoted to the rank of master commandant, and in July, 1812, to that of captain. A few days after the declaration of the war of 1812 against England, he sailed from New York in command of the frigate Essex, 32, and in a very short cruise captured a number of British merchantmen. He also with great address succeeded in capturing one of a fleet of transports convoyed by a frigate and bomb vessel. This prize had 150 troops on board. Soon afterward he fell in with and captured, after an action of 8 minutes, H. B. M. S. Alert, of 20 18-lb. carronades, with a full crew. So well directed was the American fire, that the Alert surrendered with 7 feet water in her hold, while the Essex was uninjured. Soon after the capture of the Alert, the Essex came into the Delaware for water and provisions, and sailed again on Oct. 27, 1812, she now being one of a squadron of 3 vessels under the command of Commodore William Bainbridge. On Dec. 11 she captured near the equator the British government packet Nocton, with $50,000 in specie on board. Capt. Porter continued to cruise in the south Atlantic, and upon the coast of Brazil, until the close of Jan. 1813, when, having failed to fall in with Commodore Bainbridge at 3 different rendezvous which had been appointed, and having ascertained that he had in fact returned to the United States, he determined to proceed to the Pacific, and destroy the English whale fishery in that ocean. The possession of the specie taken from the Nocton, and the knowledge that the whalers were always well provided with provisions, satisfied him that he could live upon the enemy, and that his plan was therefore practicable. The Essex left St. Catharine's on Jan. 26, and after a tempestuous passage round Cape Horn was fairly in the Pacific on March 5, 1813. On the 15th he anchored for supplies in the port of Valparaiso, where his reception was favorable, Chili having declared her independence of Spain. While in this port he obtained much valuable intelligence in regard to the British and American trade in the Pacific, and also learned that Peru had sent out cruisers against American commerce, under the impression that Spain would soon declare war against the United States, which might legalize their captures. The supplies of the Essex being completed, she went to sea, and on March 25 captured the Peruvian privateer Nereyda, of 19 guns, which had taken two American whale ships, and had their crews on board as prisoners. They were transferred to the Essex, and the armament, ammunition, shot, small arms, &c., of the Nereyda were thrown overboard, when she was released. One of her prizes was shortly afterward recaptured and restored to her commander. After this, Capt. Porter cruised about 10 months in the Pacific, refitting his ship in the bay of Nukahiva. In this cruise most important service was performed by the Essex. American ships, nearly all of which would otherwise have been captured, were protected; 12 British ships employed chiefly in the sperm whale fishery, amounting in the aggregate to 3,369 tons, were captured; 400 prisoners were made; and for the time that important British interest in the Pacific was destroyed. The Georgiana, whaler, was converted into a vessel of war, named the Essex Junior, and cruised in company with the Essex, under the command of Lieut. John Downes. The expectation which Capt. Porter had formed of living upon the enemy was fully realized, all the provisions, clothing, medicines, and stores of every description necessary for the Essex being taken from her prizes. On Dec. 12, 1813, the Essex and Essex Junior sailed from the bay of Nukahiva, and on Feb. 3, 1814, they arrived at Valparaiso. On the 8th H. B. M. frigate Phœbe, rated 36, Capt. James Hillyar, and sloop Cherub, rated 20, Capt. Tucker, arrived, and anchored near the Essex. The Phœbe, on entering the port, approached the Essex nearer than strict neutrality seemed to justify, and being taken aback at an unfortunate moment, her jib-boom came across the forecastle of the latter. All hands were called "to board the enemy!" and in an instant the entire crew of the Essex were ready to spring completely armed upon the decks of the Phœbe. But as the hulls of the ships did not absolutely touch, and Capt. Hillyar apologized for the accident, Capt. Porter declined to profit by the manifest advantage he had over the Phœbe, and no conflict took place. Capt. Porter was visited on shore by the two British captains the day after their arrival, and Capt. Hillyar distinctly avowed his intention to respect the neutrality of the port. The English ships, having obtained their supplies, cruised off Valparaiso 6 weeks. The Essex made several unsuccessful attempts to engage the Phœbe alone, but there is little doubt that Capt. Hillyar was instructed not to permit this if it could possibly be avoided. The numerous captures made by the Essex had filled the English underwriters and merchants who had property in the Pacific with such apprehension, that her capture at all hazards was resolved upon; and not only were these two ships despatched in quest of her, but others were sent for the same object to the China seas, off New Zealand, Timor, and New Holland, and a frigate to the river La Plata. On March 28 the Essex made an attempt to get to sea, but in doubling a headland was struck by a squall, which carried away her maintopmast, causing the loss of several men. In this crippled state the ship was anchored 3 miles from the town, and within pistol shot from the shore. She was, moreover, within half a mile of a small battery. In this situation she was attacked by the Phœbe and Cherub. The exact force of the combatants was as follows. The Essex was a frigate of 860 tons, mounting 32 guns, 6 of which were long 12s, the rest 32-lb. carronades, and mustered, when she went into action, 255 souls. The Phœbe was a frigate of 926 tons, mounting 46 guns, viz., 30 long 18s and 16 32-lb. carronades, and mustered 320 souls. The Cherub mounted 28 guns, viz., 18 32-lb. carronades, 8 24-lb carronades, and 2 long 9s, with a crew of 180 souls. At 4 P. M. the Phœbe, having obtained a good position, nearly astern of the Essex, opened her fire at long shot, the Cherub opening hers at the same time on the starboard bow. The action thus commenced continued 2 hours and 30 minutes, and was undoubtedly one of the most remarkable in the history of naval warfare. The Essex Junior took no part in it, her armament of 18-lb. carronades being too light to be of the least service in such an action. The Essex finally surrendered, with a loss of 58 killed, 66 wounded, and 31 missing—making a total loss of 152 out of 255. Of the missing, most were probably drowned in attempting to swim ashore when the ship was on fire, which was the case at one time during the engagement; and when she surrendered, Capt. Porter and Lieut. McKnight were the only commissioned sea officers who remained unhurt. A large portion of her guns were disabled, the berth deck, ward room, steerage, and cockpit were full of wounded, and some of the latter were killed even while under the surgeon's hands. The sea was perfectly smooth, and the Cherub fired her long 18s during the latter part of the engagement at a nearly unresisting ship. The British loss was but slight, 5 killed and 10 wounded, the first lieutenant of the Phœbe among the former. Capt. Tucker of the Cherub was wounded. Capt. Porter now made arrangements with Capt. Hillyar for the conversion of the Essex Junior into a cartel, and all the survivors of the Essex came to the United States in her. On his arrival he was received with great distinction. His narrative of this remarkable cruise was published in New York in 1822 (2 vols. 8vo.). From April, 1815, to Dec. 1823, he served as a member of the board of navy commissioners, which position he resigned to take command of an expedition fitted out against pirates in the West Indies. The squadron consisted of 3 sloops of war, 12 smaller vessels, and 5 barges. A depot was established at Thompson's island near Key West, and a system of the most active, arduous cruising at once commenced. In Oct. 1824, upon evidence that a quantity of valuable goods had been carried by pirates to a small town on the E. end of Porto Rico called Faxardo, the Beagle, one of the schooners of the squadron, was sent to aid in recovering it. Her commander, with one of his officers, visited the town and waited upon the proper authorities; but their commissions, which were duly produced, were pronounced forgeries, and these officers, charged with being pirates, were thrown into prison. After various other insults they were permitted to return to their vessel. Com. Porter deemed this an insult to the flag of the United States which must be atoned for; and as soon as the necessary arrangements could be made, he landed a force of 200 men, and demanded reparation. This was given. The authorities apologized to the commander of the Beagle personally, and promised thereafter to respect the rights of the American officers. For this step Com. Porter was recalled from his command. The government deemed that he had exceeded his powers, and a court martial sentenced him to a suspension for 6 months. He soon afterward resigned, and entered the service of Mexico as commander-in-chief of her naval forces, at a salary of $25,000 per annum. He remained in this service until 1829, when he returned to the United States, and was appointed by President Jackson consul-general to the Barbary powers, from which post he was transferred to Constantinople as chargé d'affaires, and finally became resident minister there, which office he held when he died. His remains were interred in the grounds of the naval asylum at Philadelphia.

PORTER, Ebenezer, an American divine, born in Cornwall, Conn., Oct. 5, 1772, died in Andover, Mass., April 8, 1834. He was graduated at Dartmouth college in 1792, studied divinity in a private theological seminary at Bethlehem, Conn., and was ordained pastor of the Congregational church at Washington in that state in 1796. In 1812 he was appointed professor of sacred rhetoric at Andover theological seminary, of which institution he subsequently became president. He wrote "The Young Preacher's Manual" (1819); "Analysis of Vocal Inflection" (1824); "Analysis of the Principles of Rhetorical Delivery" (1827); and "Lectures on Homiletics and Preaching, and on Public Prayer, with Sermons and Addresses" (1834). A collection of his "Lectures on Eloquence and Style" was published by the Rev. L. Matthews (8vo., Andover, 1836).

PORTER, Jane, an English novelist, born in Durham in 1776, died in Bristol, May 24, 1850. She lost her father in childhood, was educated at Edinburgh, and afterward removed to London with her mother and sister. Here she published her first novel, "Thaddeus of Warsaw," which was translated into several continental languages, and obtained for her the compliment of admission as a lady canoness into the Teutonic order of St. Joachim. In 1809 she published "The Scottish Chiefs," a novel founded on the adventures of Bruce and Wallace, which like the preceding was very popular, giving a highly romantic account of the character and times of its heroes. "The Pastor's Fireside," "Duke Christian of Luneburgh," "The Field of Forty Footsteps," and "Sir Edward Seaward's Diary" (1831) are her other most important works. The last is a work of fiction, but so life-like in its style and narrative that a leading review discussed it as a veritable history. In 1841 Miss Porter accompanied her brother, Sir Robert Ker Porter, to St. Petersburg, and after his death returned to England.—Anna Maria, sister of the preceding, born in Durham about 1781, died near Bristol, June 21, 1832. In her childhood she was much in the company of Walter Scott, who delighted in relating stories to her. Her first works were two collections of "Artless Tales" (1793 and 1795), beside which she wrote "Walsh Colville" (1797), "Octavia" (3 vols., 1798), "The Hungarian Brothers" (1807), "Don Sebastian" (1809), "Ballad Romances and other Poems" (1811), "The Recluse of Norway" (1814), "The Village of Mariendorpt," "The Fast of St. Magdalen," "The Knight of St. John," in conjunction with her sister Jane, and "Tales round a Winter's Hearth."

PORTER, Peter Buell, an American soldier, born in Salisbury, Conn., Aug. 14, 1773, died at Niagara Falls, March 20, 1844. He was graduated at Yale college in 1791, studied at the Litchfield law school, and in 1795 began practice at Canandaigua, N. Y. In 1809 he was chosen a representative in congress, where as chairman of the committee on foreign relations he prepared and introduced the celebrated report of Dec. 1811, recommending war against Great Britain. As soon as hostilities had been declared he resigned his seat in congress, and, refusing a commission as general in the regular army, was appointed quartermaster-general of New York, and after some time spent in arousing the military spirit of the state, received the command of a body of Pennsylvania and New York volunteers and Indians of the Six Nations. Black Rock, where Gen. Porter resided, having fallen into the hands of the British in June, 1813, and his own house, from which he had barely time to escape, made their headquarters, he rallied a force by which they were expelled, and their commander, Col. Bishop, mortally wounded. He held a command in Smythe's unfortunate "army of invasion," and was twice permitted to embark to lead the van of the army into Canada, and twice recalled before he reached the opposite shore. His comments on this treatment led to a duel between him and Gen. Smythe. In July, 1814, he joined Brown's invading army with a brigade of 3,500 volunteers and Indians. He exhibited "great personal gallantry" at Chippewa, and led the volunteers at Lundy's Lane. Besieged with Brown in Fort Erie, he led the brilliant and effective sortie of Sept. 17. Passing during the engagement with his staff from one column to another, he came suddenly upon a party of some 80 English soldiers, separated from the main body, and bewildered in the *mêlée*. He went up to them, putting on a bold face, and saying: "That's right, my good fellows! surrender, and I'll take care of you," at the same time throwing down the muskets of those nearest to him. This had been done to a number, when the remainder, recovering their presence of mind, rushed upon him and would have made him prisoner, had not a body of Americans providentially appeared to rescue the general, and kill or capture the enemy. A gold medal from congress, and a sword from the state, testified the public appreciation of his services. Gen. Porter was identified with the progress of western New York, was one of the earliest projectors of the Erie canal, and was named, with Morris and Clinton, on the first board of commissioners to explore a route for it. In 1816 he was appointed commissioner under the treaty of Ghent for determining the N. W. boundary. In May, 1828, he was appointed secretary of war by President Adams.

PORTER, Sir Robert Ker, an English artist and traveller, brother of Jane and Anna Maria Porter, born in Durham in 1780, died in St. Petersburg in May, 1842. His taste for art was awakened by Flora Macdonald while he was pursuing his education at Edinburgh. Through the influence of West he was admitted to the royal academy at the age of 10, and at the age of 12 was commissioned to paint "Moses and Aaron" for Shoreditch church. His most remarkable productions were battle pieces. His "Storming of Seringapatam," which was exhibited in 1800, was 120 feet long, and is said to have cost him only 6 weeks' labor. It was destroyed by fire. He also painted "The Siege of Acre," "Agincourt," "The Battle of Alexandria," and "The Death of Sir Ralph Abercromby." In 1804 he went to Russia where he obtained the appointment of historical painter to the czar, and painted on the walls of the admiralty "Peter the Great planning the Port of Cronstadt and St. Petersburg." Returning to England about 1806, he published "Travelling Sketches in Russia and Sweden" (2 vols. 4to., 1808); accompanied Sir John Moore's expedition to the Peninsula in 1808–'9; wrote anonymous "Letters from Portugal and Spain" (1809); and afterward made a second visit to Russia, where in 1811 he married the daughter of Prince Sherbatoff. In 1813 he published "An Account of the Russian Campaign." From 1817 to 1820 he travelled in Asia, engaged in antiquarian studies, which are detailed in his "Travels in Georgia, Persia, Armenia, ancient Babylonia," &c. (2 vols. 4to., 1821–'2). In 1826 he was appointed British consul at Caracas, Venezuela, where he painted three of his best pictures, "Christ at the Last Supper blessing the Cup," "Our Saviour blessing the Little Child," and an *Ecce Homo*. Having obtained leave of absence for the purpose of another visit to Russia, he went with his sister Jane to St. Petersburg, and died of apoplexy as he was about returning home. He was knighted by the prince regent in 1813.

PORTEUS, Beilby, an English prelate, born in York in 1731, died in London, May 14, 1809. He was admitted a sizar of Christ's college, Cambridge, where he obtained a fellowship. He first became known as a writer by his prize poem on death. In 1762 he became chaplain to Dr. Secker, archbishop of Canterbury, by whom he was presented to several benefices, and in 1769 chaplain to George III. and master of the hospital of St. Cross, near Winchester. In 1776 he was made bishop of Chester, and in 1787 was promoted to the diocese of London, over which he presided till his death. He established a fund for the relief of the poorer clergy of his diocese, and founded 3 prizes in Christ's college, Cambridge, as incitements to the study of divinity. His collected works, including sermons, tracts, a "Summary of Christian Evidences," a "Life of Archbishop Secker," &c., with a life by his nephew the Rev. Robert Hodgson, were published in 1816 (6 vols. 8vo., London).

PORTICO (Ital.; Lat. *porticus*), in architecture, a term originally applied to any sheltered place for walking supported by columns or arches, but now restricted in its signification to a sheltered space enclosed by columns at the entrance of a building. Such structures are usually roofed with a pediment, and in appearance resemble the front or end of a Greek temple. They have an even number of columns, ranging from 4 to 12, in front, and are called prostyle when they project from the main building. Such as are recessed within the front of a building, or, technically speaking, *in antis*, are properly *loggie*. The portico differs from the porch, with which it is frequently confounded, in forming an integral part, or perhaps the whole, of the front of a building, while the porch is only a subordinate part of the building to which it is attached. The most celebrated and perfect specimen of the portico is that of the Parthenon in Athens. (See ARCADE, and COLONNADE.)

PORTINARI. See BEATRICE.

PORTLAND, a city and port of entry, capital of Cumberland co., Me., situated on an arm of the S. W. side of Casco bay, in lat. 43° 39' N., long. 70° 15' W., 105 m. by railroad N. N. E. from Boston; pop. in 1860, 26,342. It stands upon a peninsula, about 3 m. long, with an average breadth of ¾ m., extending into the bay in an easterly direction, with the surface rising from the sides and forming an elevated ridge which terminates at its extremities in two considerable hills. The harbor has sufficient depth of water for vessels of the largest class, is very extensive and well sheltered by several islands, and in the most severe winters is seldom closed by ice. It is of easy access, and the principal entrance, which lies between the mainland and House island, is defended by Fort Preble on the former and Fort Scammel on the latter. The U. S. government is now erecting a new granite casemated fort on Hog Island ledge in the harbor, which will command the 4 entrances. The greater part of the city is regularly laid out and well built, principally of brick, and is remarkable for the elegance of many of the houses. Many of the streets are lined with elm and other shade trees. The new custom house, post office, and United States court rooms occupy a handsome structure at the corner of Exchange and Middle streets, 125 feet in length, 65 feet in breadth, and 3 stories high. It is built of granite and iron, perfectly fire-proof. Portland has 26 churches, several of which are built of stone and brick, and in size and style compare favorably with the best in New England. The new city hall is one of the largest and most elegant public buildings in the country. Its front of olive-colored freestone, elaborately dressed, is 150 feet long, over 60 feet high, and surmounted with an elegant dome; its side elevation on Myrtle street is 232 feet, embracing a hall which is 112 by 82 feet, and capable of seating 2,500 persons. It cost about $275,000, and covers an area of over 25,000 feet. The Maine charitable mechanic association, incorporated in 1815, has erected a substantial granite and brick building on Congress street. It contains a fine hall, library, and other rooms, and cost $26,000. Its library, intended for the use of members and apprentices, numbers about 2,000 volumes. The Portland Athenæum was incorporated as a public library in 1827; it has over 9,000 volumes, and has lately erected a substantial brick library room on Plumb street, 60 by 36 feet. The society of natural history, organized in 1843, has a cabinet containing specimens of the ornithology of the state, a valuable collection of shells, numerous mineralogical and geological specimens, and a cabinet of different kinds of animals. It possesses a commodious brick hall and lecture room on Congress street. The mercantile library association, organized in 1851, sustains a course of public lectures annually, and has a library of over 3,000 volumes. Great attention is paid to education in the public schools, of which there are 26 in the city and its environs. Of these, one is a classical school for boys, one a high school for girls, and 2 intermediate for boys and girls; 6 are grammar schools, 3 for girls and 3 for boys; and the remainder are primary schools. The annual expenditure for public schools is about $50,000. There are also numerous private schools and an academy. There are 11 newspapers published at Portland, 3 of which are daily.—Five railroads which communicate with different parts of the United States and Canada have their termini at Portland, viz.: the Portland, Saco, and Portsmouth, the Kennebec and Portland, the Androscoggin and Kennebec, the York and Cumberland, and the grand trunk, which last extends from Portland *via* Montreal and Toronto to Sarnia, at the foot of Lake Huron, thence connecting with Detroit, a distance of 858 miles. Among the principal manufacturing establishments is that of the Portland locomotive and marine engine building company, which has the machinery to employ 400 workmen; and an extensive sugar house, which boils over 20,000 casks of molasses annually. There are several extensive manufactories of carriages, sleighs, &c. The city is lighted with gas and well supplied with good water, and is considered remarkably healthy. There are 7 banks, with an aggregate capital of $2,650,000, 2 insurance offices, and 2 savings banks, whose deposits amount to $500,000. The foreign trade is chiefly carried on with the West Indies and Europe, the exports being for the most part provisions, lumber, ice, and fish, and the imports molasses, sugar, crockery, salt, and iron. Portland also has a large coasting trade, with regular lines of steamboats running to New York, Boston, Bath, Bangor, Eastport, and St. John, N. B. The Canadian line of European steamers runs weekly from Portland to Liverpool, *via* Londonderry, during the winter months. The total value of the imports in 1859 amounted to $1,668,521, and the exports to $1,221,606. The foreign arrivals for the year were 599 vessels of an aggregate of 120,906 tons, of which 388, of an aggregate of 101,422 tons, were under the flag of the United States. On June 30, 1859, the aggregate tonnage of the port was 115,093, of which 3,969 tons were steam vessels. The registered tonnage consisted of 68,307 tons permanent, and 25,537 temporary; and the enrolled and licensed of 24,841 tons permanent, which were employed as follows: 15,997 tons in the coasting trade, 3,128 in the cod fishery, 1,715 in the mackerel fishery, and 351 tons, licensed under 20 tons, which, with the exception of 34 tons engaged in the coasting trade, were employed in the cod fishery. In the year 1857, 4 ships and barks, 2 brigs, 7 schooners, and 1 steamer, of an aggregate of 3,868 tons, were built.—The Indian name of Portland was Machigonne. An English colony settled here in 1632, but during the subsequent wars with the Indians, French, and the mother country, it suffered very severely, and the town was three times completely destroyed. Portland, which originally formed a part of Falmouth, was incorporated as a town in 1786, and as a city in 1832.

PORTO BELLO. See PUERTO BELLO.

PORTO FERRAJO, the capital of the island of Elba, Italy, on a rocky promontory at the head of a bay, 5 m. S. W. from Cape Vita, on the N. side of the island; pop. about 5,000. It has an excellent harbor, defended by 2 strong forts and several batteries. There are 2 churches, a town hall, barracks, military hospital, and the governor's palace, occupied from May, 1814, till Feb. 26, 1815, by Napoleon.

PORTO RICO, or PUERTO RICO, an island of the Greater Antilles, West Indies, belonging to Spain, extending from lat. 17° 55′ to 18° 30′ N. and from long. 65° 39′ to 67° 11′ W.; extreme length 105 m., breadth 40 m.; area, 3,800 sq. m.; pop. in 1850, 380,000, $\frac{1}{8}$ of whom are slaves. The N. coast is lined with navigable lagoons, and many of the rivers can be ascended for 5 or 6 m. from the sea. There are numerous bays and creeks, but the N. coast is subject to a ground swell which breaks against the cliffs with violence, and none of the harbors except those of Guanica, Hovas, and San Juan are safe at all seasons. A range of mountains runs through the island from E. to W., having a general height of about 1,500 feet above the sea, with one peak of 3,678 feet. In the interior there are extensive plains, and in some places along the coast there are tracts of level fertile land, from 5 to 10 m. wide. Gold, copper, iron, lead, and coal are found; and considerable quantities of salt are procured. The climate, though very warm, is generally considered more healthy than that of any other of the Antilles. The soil is particularly fertile, the proportion of sugar obtained from an equal area being much greater than in any of the other West India islands. The value of the imports during the year 1855 amounted to $5,785,990, and that of the exports to $4,771,715. The trade with the United States in 1858 was as follows: imports, $500,260; exports, $358,402; American vessels entered, 518, out of a total of 1,494.—Porto Rico was discovered by Columbus in 1493, and invaded in 1509 by the Spaniards, who in a few years exterminated the natives, then about 600,000 or 800,000 in number.—The capital, San Juan de Porto Rico (pop. 10,000), stands upon a small island on the N. coast, connected with the mainland by a bridge. It is strongly fortified, and has been three times unsuccessfully and once successfully attacked by the British.

PORTSMOUTH. I. A township and city of Rockingham co., N. H., and the only seaport in the state, situated on the S. side of the Piscataqua river, in lat. 43° 5′ N., long. 70° 46′ W., 3 m. from the sea and 54 m. N. by E. from Boston; pop. in 1860, 9,335. The city stands on a beautiful peninsula formed by the Piscataqua. Among the public edifices are 10 churches (2 Baptist, 1 Christian, 1 Calvinistic Congregational, 1 Episcopal, 2 Methodist, 1 Roman Catholic, 1 Universalist, and 1 Unitarian); an athenæum, which is a handsome 3 story brick building, with a library and cabinets of minerals and objects of natural history; an academy, a state arsenal, 2 market houses, and an almshouse. There are 4 banks with an aggregate capital in 1856 of $691,000, and a savings bank with deposits in January of that year amounting to $836,371. The town is supplied with water from a distance of 3 miles by works constructed by a company formed in 1799. The manufactures are of considerable extent, and include cotton fabrics, hosiery, ale, and beer. The town has also a machine shop and 2 iron founderies, and contains 8 newspaper offices, 18 public schools, including high schools for girls and boys, a marine society, a mechanics' association, and the Howard benevolent society. The harbor can accommodate 2,000 vessels, is particularly safe, and has sufficient depth at low water for the largest class of ships. It is much frequented as a port of refuge, and the rise of the tide and strength of the current keep it free from ice during the severest winters. The principal entrance is between the mainland and the E. side of Great island, and is defended by Fort McCleary on the former, and Fort Constitution on the N. W. point of the latter. The U. S. navy yard is the object of greatest interest at Portsmouth. It is situated on Continental or Navy island, on the E. side of the Piscataqua. It has extensive ship houses, one of which is 300 feet long, 131 wide, and 72 high; large sheds for timber, a rigging loft, machine shop, &c. The balance dry dock is 350 feet long by 105 broad, and has 24 pumps worked by two steam engines. In the year ending June 30, 1860, the exports amounted to $9,605 and the imports to $23,227; 48 vessels of an aggregate of 4,857 tons entered, and 47 of an aggregate of 4,080 tons cleared. The number of vessels built during that year was 6, of an aggregate of 3,846 tons. The shipping belonging to the port in 1860 amounted to 34,485 tons, and many of the ships owned at this port are employed in the trade of other parts of the world. Portsmouth has great facility of communication by railroad with all parts of the surrounding states. It is a station on the eastern Massachusetts railroad, and is connected with numerous other lines by the Concord and Portsmouth railroad. The town was settled in 1623, and incorporated in 1633. It has often suffered severely from fires. II. The capital of Norfolk co., Va., on the W. bank of Elizabeth river, opposite the city of Norfolk, 8 m. from Hampton roads; pop. in 1860, 9,487. It is built on level ground and regularly laid out, and has a court house, a branch of the bank of Virginia, the Virginia literary, scientific, and military academy, 8 newspapers, and 6 churches. By the Seaboard and Roanoke railroad and the James river it has extensive communication, both north and south. (See NORFOLK.) III. The capital of Scioto co., O., on the Ohio river, immediately above the junction of the Scioto, at the terminus of the Scioto and Hocking valley railroad and the Ohio and Erie canal, 115 m. E. by S. from Cincinnati, and 90 m. S. from Columbus; pop. in 1860, 6,268. It has an active business, and regular communication by steamboat with Cincinnati. It contains a bank, 4 private banking establishments, 2 distilleries, 2 rolling mills and iron works, 3 machine shops and founderies, 14 churches, and 5 newspaper offices.

PORTSMOUTH, a fortified town of Hampshire, England, situated on the S. W. extremity of the island of Portsea, 68 m. S. S. W. from London; pop. in 1851, 72,096. It consists of two towns, Portsmouth proper and Portsea, separated from each other by a small creek or arm of the sea crossed by bridges. Both towns are united in one complete fortress surrounded by deep moats and strong walls flanked by regular bastions, the whole defended by a series of outworks. Some of the dwellings are very ancient, and the house in which the duke of Buckingham was assassinated during the reign of Charles I. is still standing in the High street. There are several churches, one of which was originally erected in 1220, and dedicated to St. Thomas à Becket, but the chancel is the only part left of the ancient building. There are extensive barracks for troops of the line. A force of 12,000 men would be necessary to fully man the fortifications, but the usual garrison consists of about 2,500. But the chief importance of the place is derived from the royal dock yard, which is situated at Portsea, to the N. of Portsmouth, and covers an area of 120 acres enclosed by walls. It contains very extensive storehouses for all the materials used in naval architecture, machine shops, extensive slips and docks in which the largest vessels of war are built and repaired, ranges of handsome residences for the port admiral and other officers, and a royal naval college which accommodates 70 pupils. During the Crimean war 4,000 men were constantly employed in the Portsmouth dock yard. Outside the yard an area of 14 acres is occupied by a gun wharf, where vast numbers of guns and quantities of warlike stores are kept. On the mainland opposite Portsmouth, and communicating with it by a steam ferry about ¾ m. across, is the town of Gosport, with a population of 7,500. The channel between these two places forms the entrance to Portsmouth harbor, here defended by South Sea castle on the E. and Monkton fort on the W., and extending several miles between the island of Portsea and the mainland, and gradually widening till it attains a breadth of about 3 m. at its N. extremity. The depth of water is sufficient for vessels of the largest class, and the harbor has the advantage of opening into the fine roadstead of Spithead which is sheltered by the isle of Wight. The only manufactures of importance are those immediately connected with the naval establishments.—The earliest notice of Portsmouth occurs in the "Saxon Chronicle" in 501, where it is called Portsmuthe. During the reign of Alfred a fleet of 9 ships was fitted out at the port, which defeated the Danes; and before the Norman conquest a large number of vessels were sent from it to intercept the invaders. The French landed and burned a great part of the town in 1377, but were ultimately defeated with heavy loss. After this disaster the fortifications were extended and improved, and have continued to receive additions up to the present time. Napoleon sailed from Portsmouth for St. Helena in 1815.

PORTUGAL, a kingdom of Europe, occupying the S. W. part of the Spanish peninsula, bounded N. and E. by Spain, S. and W. by the Atlantic, and extending from lat. 36° 57' to 42° 11' N., and from long. 6° 20' to 9° 49' W.; length from N. to S. about 360 m., greatest breadth about 130 m.; area, 35,400 sq. m.; pop. in 1857, 3,566,895, and of the Portuguese colonies 2,754,380, making the total population of the monarchy 6,321,275. The colonies are the Azores, Madeira, and Porto Santo (though administratively these islands are ranked as component parts of the kingdom), the islands of Cape Verd, Principe, St. Thomas, and Anno Bom on the African coast; some portions of Guinea; Angola and Benguela; Mozambique and its territory; Goa, Daman, and Diu in Hindostan; the islands of Timor and Solor; and the city of Macao in China. The kingdom is divided into 6 provinces, viz.: Entre Minho e Douro, the most northerly, Tras-os-Montes, Beira, Estremadura, Alemtejo, and Algarve, the most southerly province. The capital is Lisbon, and the other chief cities are, in the order of their population, Oporto, Coimbra, Elvas, Braga, Setubal, Evora, and Ovar. None of these except Lisbon and Oporto have more than 20,000 inhabitants.—The coast line is about 500 m. in length, and is not indented by any great bay. At some points it rises into cliffs of considerable height, but the greater part is low and marshy. The principal harbors are those of Lisbon, Oporto, Setubal, Figueira, Aveiro, and Viana. The principal rivers of Portugal flow from Spain, and of these the Tagus, the Guadiana, the Douro, the Minho, and the Lima are the largest. The

Tagus separates the provinces of Beira and Alemtejo, and passing through Estremadura falls into the Atlantic, by a mouth so wide that it is rather an arm of the sea than a river. Its estuary forms the spacious and convenient harbor of Lisbon. The river is navigable to Abrantes, 80 m. above its mouth. Of the rivers which have their whole course in Portugal, the longest are the Mondego, which is navigable for 60 m., the Cavado, Ave, Vouga, Sado, Odemira, Portimao, and Rio Quarteira. In summer these streams become very low, and they are in general much obstructed by rocks and sand bars. There are many lakes on the sea coast, but none of much magnitude. Mineral springs abound, and there are 34 hot springs, many of which are celebrated for their medicinal qualities.—The mountain chains of Portugal are chiefly prolongations in a W. or S. W. direction of the Spanish Pyrénées. Near the N. frontier is a lofty range called the Serra de Montezinho, one of whose peaks, Gaviarra, is 7,850 feet high, and is said to be always covered with snow. The Serra de Gerez, also in the northern provinces, rises where highest 7,360 feet. The Serra d'Estrella, which traverses the province of Beira, is the continuation of a chain from the Spanish provinces of Leon and Castile, and is covered with snow during most of the year; its highest peaks are Cantaro Delgardo and Malao da Serra. A branch of it stretches through Estremadura and terminates at the sea near the mouth of the Tagus, in the promontory called Cabo de Roca or Rock of Lisbon. A prolongation of the great Spanish range of the Sierra Morena encloses the province of Algarve and terminates at Cape St. Vincent; its highest peaks are Foya, 3,840 feet, and Picota, 3,720 feet, near its W. extremity. The mountain scenery of Portugal is exceedingly fine, and few places in the world equal in natural beauty the region around Cintra in the neighborhood of Lisbon.—In its geological character Portugal resembles Spain. Much of the mountainous region of the W. is formed of crystalline rocks. The E. part of Tras-os-Montes, however, consists of slates. A band of crystalline rocks nearly 50 m. broad stretches almost from one end of the country to the other. The district of the upper Douro is formed of slate rocks belonging to the silurian system, and nearly surrounded by granitic and syenitic mountains. In this district is the coal field of Vallongo, which yields anthracite coal. South of Abrantes is a tertiary basin with an area of more than 2,000 sq. m., in which Lisbon stands. To the S. of this basin secondary beds appear, and still further S. between Alemtejo and Algarve is a lofty chain of hills consisting of schists and slates. In the days of the Romans gold and silver were found in Portugal, and gold is still collected from the sands of the rivers, though not in great quantity, the principal mine, that of Adissa near Setubal, yielding an average of 20 lbs. a year. There are mines of lead, plumbago, antimony, copper, and iron, the last named metal being particularly abundant. But from want of enterprise and capital little use is made of the great mineral riches of the country. Beautiful marbles abound, and there are quarries of limestone, gypsum, slate, freestone, millstone, and black agate, together with vast beds of potters' and porcelain clay and of common salt. In 185[illegible] salt was exported to the amount of 35,000,[illegible] bushels.—There is great inequality in the soil of Portugal, but much of the land is exceedingly fertile and well adapted to the growth of all the productions of the temperate zone. The climate among the mountains of the N. is cold and harsh, but on the coast and in the lowlands of the centre it is mild and genial. Lisbon is a place of resort for invalids, and though the southern provinces are exposed to great heats they are not of long continuance, being tempered by breezes from the ocean. Violent storms are very rare, and the cold is never severe except in elevated situations. The vegetation does not differ materially from that of the rest of the peninsula. Among the trees and shrubs are the cork tree and the kermes oak, the bay tree, Portugal laurel, Spanish chestnut, carob tree, myrtle, pomegranate, rosemary, lavender, licorice tree, and in the south various species of palm, the dragon tree, coral tree, the oleander, and the American agave. The orange, the fig, sugar cane, and rice grow luxuriantly, and the wheat, grapes, and olives of Portugal are unsurpassed. Among the wild animals of the country, wolves, wild cats, wild goats, wild boars, and deer are the principal, though none of these are numerous. Venomous serpents abound in the mountains, but are rare in the plains and valleys. There are few birds, the most common being the partridge, and in the mountains vultures and eagles. The coast and the rivers swarm with fish, but the fisheries are carried on so imperfectly that great quantities of salted fish are imported.—The Portuguese are a handsome race, with regular features, olive complexions, and dark, expressive eyes. The reputation of the higher orders is not very good among their neighbors the Spaniards, who have a proverb which says: "Strip a Spaniard of his virtues, and you have a Portuguese;" but unprejudiced observers describe the peasantry as possessed of many noble traits of character, though grievously burdened by oppression and misrule. Agriculture among them is in a very backward condition, the implements used being rude and clumsy, and the whole system of tillage imperfect and unthrifty. The northern provinces are the best cultivated, and their people far more prosperous and intelligent than in the south. The great staples of the country are wheat, wine, and olive oil. The milk chiefly consumed is that of goats. The common bread of the people is made of Indian meal, the soil and climate being both well adapted for the production of maize. Hemp and flax are extensively grown, and beans and other garden vegetables are raised in abundance. Oranges, almonds, and figs are exported. According to the official reports, the average annual agricultural production of the country amounts in value to $40,000,000, the grain being valued at $10,000,000, the wine at $12,000,000, and the wool at $7,000,000. The wines of Portugal have long been celebrated, the most famous being port. (See PORT WINE.) The manufactures of Portugal are not extensive. Woollen cloth is made at Lisbon, Covilha, Portalegre, and Azeitao; cotton goods at Lisbon, Oporto, and Thomar; silk in Algarve; steam engines, iron and tin work, firearms, porcelain, gold and silver work, pottery, candles, and soap at Lisbon, where also there are tanneries, distilleries, and sugar refineries. Wine, oil, salt, wool, fruits, and cork bark are the chief articles of export; and the imports consist principally of the finer kinds of English manufactures, and of coal, tar, pitch, drugs, butter, cheese, and salt fish. The imports in 1854 amounted in value to $20,223,000, and the exports to $15,797,500. About ⅔ of the exports are to Great Britain, and the rest to Brazil, the United States, France, Spain, Russia, Sweden, and Norway. The common roads of Portugal are very bad, and until recently the country was very deficient in means of internal communication. But within a few years two great systems of railroads have been designed and partly completed. One line runs from Lisbon to Santarem, and thence to Oporto, with a branch line to Elvas on the Spanish frontier. Good macadamized roads have also recently been constructed in the provinces N. of the Douro, which in every respect are far in advance of the rest of the country.—The government of Portugal is a limited monarchy under a constitution adopted in 1826. The legislative power is vested in a cortes consisting of two houses, one of peers and the other of deputies; the peers are named for life by the crown, and the deputies chosen by electors, who must have a yearly income of not less than $100. The administration is conducted by 7 ministers, who form the cabinet. In 1856 the titled and hereditary nobility (which is distinct from the house of peers, though nobles may be appointed by the crown to seats in that house) comprised 7 dukes, 21 marquises, 77 counts, 102 viscounts, and 106 barons. For judicial purposes Portugal is divided into 105 districts, in each of which there is a judge, from whose decision there is an appeal to superior courts at Lisbon and Oporto. These judges remain but 6 years at the same place, and are appointed by the crown. Beneath them are inferior classes of judges, who are elected by the people for a term of two years. Trial by jury is established in criminal cases, and also in civil, unless the parties agree to be tried by the judge exclusively. The Roman Catholic is the state religion, and the ecclesiastical establishment consists of a primate, the archbishop of Braga, under whom are 6 bishops; the patriarch of Lisbon, under whom are 3 bishops; and the archbishop of Evora, under whom are 3 bishops. There are also bishops in the colonies of the Azores, Madeira, Cape Verd, St. Thomas, and Angola; and at Goa in India there is an archbishop who has under him 7 bishops and a prelate. All other religions are tolerated, and there are Protestant chapels in Lisbon and Oporto. Public education is under the direction of the minister of the interior, and is managed by a council which holds its sittings at Coimbra. The church has no control over it. By law parents are compelled to send their children to school, but this law is only partially enforced. The only university in the kingdom is that of Coimbra. (See COIMBRA.) The primary schools in 1854 numbered 1,126, attended by 38,000 scholars, of whom only 1,570 were females. The lyceums or schools of the next grade numbered 162, with 2,800 pupils. There are polytechnic academies, medical schools, and academies of fine arts at Lisbon and Oporto; a military college at Mafra; army and navy schools at Lisbon; and agricultural institutes and botanical gardens at Lisbon and Oporto. For the education of the clergy there are 6 seminaries and 8 halls of theology. The finances of the Portuguese government are in a very disordered condition, the expenditures having for a long period exceeded the receipts. In 1860 the receipts amounted to $14,862,000, and the expenditures to $15,782,000. The public debt in 1859 was $120,000,000. The army in 1860 numbered 24,852 men, beside a colonial force of about 18,000, stationed chiefly in Africa and the East Indies. The navy comprised 40 sailing vessels and 16 steamers, manned by a force of 3,698 men.—Portugal was inhabited anciently by Celtic tribes, and was early visited for commercial purposes by the Phœnicians, Carthaginians, and Greeks. The Romans, who called it Lusitania, from its chief tribe the Lusitani, effected its final subjugation about 140 B. C., and held it as a province till the 5th century of the Christian era, when it was overrun by the Visigoths and other northern barbarians. In the 8th century it was conquered by the Arabs, from whom it was partly recovered toward the close of the 11th century by Alfonso VI., king of Leon and Castile. About the year 1095 Alfonso gave the country between the Minho and the Douro to his son-in-law, Henry of Burgundy, who took the title of count of Portugal, and soon extended his dominions by conquests from the Arabs or Moors. He died in 1112, and was succeeded by his son Dom Alfonso, who in 1139 defeated the Moors in a great battle on the plains of Ourique near the Tagus. From this battle the Portuguese date the foundation of their kingdom, Dom Alfonso having been proclaimed king by his army on the field of victory. His son and successor, Dom Sancho I., was equally successful in the struggle with the Moors, and by his valor and abilities raised Portugal to a high pitch of prosperity and power, and extended its area to its present dimensions. Of his successors the most distinguished was John I., surnamed the Great, who began his reign in 1385. He repelled a formidable invasion of the Castilians, led a successful expedition against the Moors of Barbary, and acquired possession of Madeira and the Azores, which were discovered during his reign. He died in 1433. The Portuguese at this period were the most enlightened and enterprising people of Europe, and their efforts to enlarge the scope of geographical knowledge toward the south led them to undertake daring and difficult voyages along the coast of Africa, which for half a century were ably and perseveringly directed by Prince Henry the navigator, the third son of John the Great. These attempts were at length crowned with success by the achievement of a passage to the East Indies round the Cape of Good Hope by Vasco da Gama in 1497. This was in the reign of Dom Emanuel the Fortunate, under whose intelligent guidance prodigious efforts were made to extend the commerce and the dominion of Portugal in Africa and the East. In the latter region their power was exercised by a succession of able viceroys, among whom Alfonso d'Albuquerque was particularly eminent. For nearly a century the Portuguese were masters of the Indian ocean, and the dominant power on the E. coast of Africa and the S. coast of Asia. In 1501 Brazil was discovered by a Portuguese adventurer, and John III., who ascended the throne in 1521, made great efforts to colonize it. He died in 1557, and was succeeded by his son Dom Sebastian, who distinguished himself by Quixotic expeditions against the Moors of Barbary, in one of which, in 1578, he perished with all his army. This disaster effectually broke the power of Portugal. Dom Henry, the uncle of Sebastian, ascended the vacant throne, and on his death in 1580 without direct heirs, the crown was claimed by Philip II. of Spain, the prince of Parma, and the duchess of Bragança. The power of Philip decided the contest in his favor, and for the next 60 years Portugal was a part of the Spanish monarchy. For a considerable period the peace of the country was disturbed by pretenders claiming to be Dom Sebastian, whom the common people believed to have escaped the swords of the Moors and to be living in a mysterious seclusion, from which he was to reappear for the redemption of Portugal. The rule of the Spanish kings bore heavily on Portugal, and in 1640 the nation rose in revolt, and by an almost unanimous voice proclaimed the duke of Bragança king, under the title of John IV. A long war with Spain ensued, which was terminated in 1665 by the decisive defeat of the Spaniards in the battle of Montesclaros. Amicable relations, however, were not fully restored between the two nations till 1737, in the reign of John V., an able and successful monarch, who died in 1750. Under his son and successor Joseph I., Portugal experienced many calamities, the most remarkable of which was the great earthquake which destroyed one half of Lisbon in 1755. This reign, however, was marked by great social and agricultural reforms, carried out chiefly by the genius and energy of the king's prime minister, the famous marquis of Pombal. Joseph was succeeded in 1777 by his daughter Maria, who became insane in 1792, and continued so till her death in 1816, her son John, prince of Brazil, acting as regent. During her reign in 1807 Portugal was conquered by a French army under Marshal Junot, by order of Napoleon, who had declared the house of Bragança to have forfeited the throne by the refusal of the prince regent to confiscate English merchandise in his dominions. The royal family embarked for Brazil and continued at Rio Janeiro till 1821, though by British assistance the French were expelled in 1812. In 1820 the dissatisfaction of the people at the absence of the court, and a general feeling that fundamental changes were required in the constitution, led to a revolution unattended by violence or bloodshed, the army and the people acting in concert. A liberal constitution was adopted, and in 1821, at the request of the nation, John VI. returned from Brazil, leaving his eldest son Dom Pedro there as regent. In the following year Dom Pedro was proclaimed emperor of Brazil, and the two countries were finally separated. John VI. died in 1826, and Dom Pedro of Brazil, the legitimate successor, surrendered Portugal to his daughter Maria, and established a new and tolerably liberal constitution for the kingdom. Before Maria arrived in Portugal, her uncle Dom Miguel, Pedro's younger brother, who had been appointed regent, usurped the throne, and began to rule without regard to the constitution. His despotism provoked a civil war, which raged for several years, and was finally terminated in 1834 by the triumph of the liberals, the expulsion of Miguel, and the establishment of Maria on the throne. Several revolutions and counter revolutions have since taken place, the principal result of which has been the substitution of one faction for another in the control of the royal ministry. The most serious of these outbreaks, that of 1846–'7, was provoked by the unpopularity of the ministry of Costa Cabral, the count of Thomar, and but for British, French, and Spanish intervention would have overthrown the government. The queen Maria died in 1853, and her eldest son Pedro V. succeeded, and is now reigning (June, 1861).

PORTUGAL, Language and Literature of. The language of the Lusitani is unknown, for at an early period it gave place to the Latin, which continued to be spoken in Portugal in comparative purity for about 6 centuries. The northern barbarians then infused into it a Gothic element, and the compound thus formed was still further corrupted 3 centuries later by a Semitic admixture. During the Moorish rule Arabic was the language generally spoken by the higher classes, and João de Souza in 1789 enumerated no fewer than 1,400 words which the Portuguese had borrowed from the Arabic and other eastern languages. The influence of the Arabic was succeeded; though its effect was not destroyed, by that of the idioms of the different foreign auxiliaries, French and others, who assisted the Portuguese in driving out the Moors. The Portuguese is thus one of the modern forms of the Romance language. It bears a remarkable affinity to the Galician, being readily understood by the Gallegos; and a less marked similitude to the Catalan. The pronunciation, though difficult for foreigners, is free from the guttural sounds which abound in Spanish, and the harsh aspirates which it might be expected to have borrowed from the Gothic and Arabic. The French nasal sounds *an*, *in*, *on* occur frequently, and the letters *j* and *ch* are also pronounced very much as in French. The peculiar diphthong *ão*, as in the termination *cião* (Fr. and Eng. *tion*) and elsewhere, is pronounced nearly like *owng* in English. The Portuguese is less sonorous and majestic than the Spanish, but more fluent, sweeter, and simpler. Sismondi called it "a boneless Castilian" (*un Castillan désossé*); the Spaniards on the other hand have styled it a language of flowers. The Latin words which form the basis of the Portuguese have undergone more changes than they have suffered in any other modern tongue. Some radical letters are almost always omitted, the consonants *l* and *n* being most frequently dropped; thus, Lat. *dolor*, Port. *dor;* Lat. *ponere*, Port. *pôr;* Lat. *populus*, Port. *povo;* Lat. *ille*, *illa*, Port. *o*, *a;* Lat. *pater*, Port. *pay*. The grammar is in general simple, the only peculiarity which deserves particular notice being the inflections of the infinitive mood of the verb, which beside the ordinary impersonal form has a personal form governed by a noun or pronoun; thus, *amar*, to love; *o eu amar*, to love me; *o tu amares*, to love thee. See Constancio, *Grammatica analytica da lingua Portugueza* (Paris, 1831), and *Nouvelle grammaire Portugaise* (1832); and Fonseca, *Éléments de la grammaire Portugaise* (1832). There are dictionaries by Da Costa and Sa (Portuguese, French, and Latin, Lisbon, 1794); Da Cunha (French and Portuguese, Lisbon, 1811); and Vieyra (English and Portuguese, new ed., London, 1840).—Portuguese literature comprises few works of any note except poems and histories. The earliest compositions of which we have any knowledge, dating from about the commencement of the 12th century, were imitations of the French troubadours. Some of the songs of Gonçalo Henriques and Egaz Moniz Coelho, gentlemen of the court of King Alfonso I., are still extant, and prove the existence of lyric poetry in Portugal two centuries earlier than in any other province of the peninsula. During the 13th and 14th centuries the poetic art was fostered by the example of several princes, such as King Denis, his natural son Alfonso Sanches, King Alfonso IV., King Pedro I., and the infante Dom Pedro, son of John I. At the same time the romances of chivalry had been diligently cultivated, especially by Vasco de Lobeira, the reputed author of "Amadis de Gaul." During the 15th century, which has been called the heroic age of Portugal, prose compositions became both more numerous and more important. Fernand Lopez, the Portuguese Froissart, Gomez Eannes de Azurara, another chronicler, and King Alfonso V., who wrote a treatise on the art of war and a little work on astronomy, are among the most noteworthy names of this period. King Edward (died 1438) composed a treatise *De Bono Regimine Justitiæ*. Damião de Goes is known as the author of a Latin treatise *De Moribus Ethiopum* and a chronicle of King Emanuel. A much higher reputation belongs to Bernardino Ribeyro (about 1500), an officer of the household of King Emanuel, who entertained a hopeless passion for the daughter of his sovereign, and told his grief to the woods and mountains in verses chiefly remarkable for overstrained sentiment and obscurity. He was more successful in other kinds of composition, and his pastoral romance *Menina e moça* ("Small and Young," so called from the words with which it begins) is the earliest example of a good Portuguese prose style. He contributed greatly to the popularity which pastoral poetry and romance acquired about this time in Portugal as well as in other parts of Europe. Of the pastoral authors contemporary with Ribeyro, Christovão Falção is the only one who deserves separate notice. The classical school of poetry was inaugurated by Saa de Miranda (died 1558), a versatile author, who like most of the poets of his country wrote in both Portuguese and Castilian; he left pastorals, sonnets, hymns, songs, ballads, epistles in verse after the manner of Horace, and two comedies, *Os estrangeiros* and *Os Vilhalpandios*. Another of the classical poets is Antonio Ferreira (died 1569), remarkable for good taste, simplicity, and correctness. His best works are his epistles, beside which he left sonnets, odes, and elegies, and a drama on the subject of Ines de Castro, constructed after the ancient Greek fashion. The maritime expeditions of this period soon opened a new field in which poets, historians, soldiers, and navigators equally found occupation. The exploits of Vasco da Gama were recounted by Fernam Lopez de Castanheda, who wrote a history of the discovery of the Indies. Mendez Pinto published an account of his extraordinary adventures, Galvão wrote his travels in Abyssinia, Francisco Alvares an account of Ethiopia, and Alfonso d'Albuquerque his "Commentaries." The chief however of the historians of this epoch was João de Barros, whose *Asia Portugueza*, continued by Couto (14 vols. fol., 1552–1615), is the first great work containing an authentic narrative of the conquests of his countrymen both in the Indies and the African seas. His style, though somewhat involved, is distinguished by purity of diction, and his descriptions are remarkably life-like. In a far more attractive garb are the adventures of Da Gama presented by Camoëns (1524–'79), the only poet of Portugal, as Sismondi observes, whose celebrity has extended beyond the peninsula. His great epic, "The Lusiad" (*Os Lusiadas*, the Lusitanians), was the first poem of the kind in any modern tongue. Its professed object was to relate the glorious deeds of the Portuguese in every age, but the greater part of it is devoted to their achievements in India. In his shorter poems Camoëns is the model of nearly all his countrymen after him. A contemporary of Camoëns was the dramatist Gil Vicente, the chief Portuguese author in a department of literature in which Portugal is remarkably deficient. He wrote *autos*, or miracle plays; comedies which are little more than novels in dialogue, totally devoid of plot and climax; tragi-comedies, rude and undeveloped; and farces which display much humor and discrimination of character. He flattered the popular taste by lugging shepherds into all his plays, and the mania for bucolics became stronger after his death than it had ever been before. Rodriguez de Lobo, an author of the latter half of the 16th century, wrote three extravagant pastoral romances entitled *Primavera* ("Spring"), *O pastor peregrino* ("The Wandering Shepherd"), and *O desenganado* ("The Disenchanted Lover"), scattered through which are some charming bits of poetry. Jeronymo Cortereal (died about 1593) is the author of an epic on the adventures of Manoel de Sousa Sepulveda, shipwrecked on the coast of Africa, and another on the "Siege of Diu." The *Ulyssea* of Pereira de Castro, and the *Malacca conquistada* of Francisco de Sa y Menezes, rank high in the opinion of Portuguese critics. Bernardo de Brito (died 1617) undertook a history of the kingdom, under the title of *Monarchia Lusitana;* but, commencing at the creation of the world, death overtook him when he had just reached the establishment of the Portuguese monarchy. Manoel de Faria e Sousa (died 1649) once enjoyed a brilliant reputation, but the quantity and variety of his works are more remarkable than their excellence. Antonio Barbosa Bacellar (died 1663) introduced those amorous and melancholy soliloquies called *Saudades*. Jacinto Freire de Andrada (died 1657), a writer of burlesque poetry, was also admired for an elaborate and affected "Life of João de Castro" in prose. The Jesuit Vieira (died 1697), surnamed the Lusitanian Cicero, is one of the most eloquent of Portuguese prose writers. Strained conceits and extravagant phraseology are the principal characteristics of the writings of Violante do Ceo (died 1693), a Dominican nun who left a great amount of sacred and profane verse. Jeronymo Bahia is notable as one of the many poets who chose for their theme the loves of Polyphemus and Galatea, a subject which Andrada burlesqued with much humor. The honor of producing one of the most natural poets of the time belongs to the island of Madeira, the birthplace of Francisco de Vasconcellos. Andrea Nuñez de Sylva, the author of excellent devotional verses, was a native of Brazil. Francisco Xavier de Menezes, count of Ericeyra (died 1743), celebrated the exploits of Henry of Burgundy in a correct and spiritless epic entitled the *Henriqueida*. Antonio José, the author of coarse but sprightly comic operas, bade fair to revive the Portuguese drama when the inquisition burned him for a Jew in 1745. Antonio Correa Garção (died 1772) wrote several comedies in imitation of Terence, and the count of Vimiero produced in 1788 *Osmia*, the only genuine tragedy in the language. João Anastasio da Cunha (died 1790), a distinguished mathematician, was also a poet of no mean rank. Araujo de Azevedo translated Dryden, Gay, and some other English poets. Francisco Manoel do Nascimento (died 1821) was noted for the dignity and boldness of his lyric verses, and Antonio Dinis da Cruz e Silva, beside imitations of English poetry, composed numerous odes and sonnets. The chief authors of the more recent period are Manoel de Barbosa Boccage (died 1806), Francisco Diaz Gomez, Francisco Cardoso, Alvarez de Robriga, Xavier de Matos, Valladares, Tolentino de Almeida, Antonio de Castilho, a translator from the English; Garret, a poet, romancer, and dramatist; Hercules de Carvalho, a patriotic and religious poet; and Luiz da Silva Mouzinho de Albuquerque, a statesman and the author of georgics.—In Brazil literature within the last few years has made more rapid progress than in Portugal. Beside the poems of Claudio Manoel da Costa, we may mention the *Historia general do Brazil* (1854) of Varnhagen, Brazilian chargé d'affaires at Madrid; the "Brazilian Plutarch" of Pereira da Silva; the sermons and compendium of philosophy of Mont'alverne; the "Chorography of Brazil" of Mello Moraes, the translation of Virgil by Mendes; and the poems of Gonçalves Diaz, Macedo, Abreo, and Magalhaens. The last named author has also written a tragedy on the fate of Antonio José, and a philosophical and physiological work entitled *Os factos do espirito humano* (1859).

PORTUGUESE MAN-OF-WAR. See Jelly Fish.

PORTULACA. See Purslane.

PORUS, the Greek form of the names of several kings of India, two of whom were met by Alexander in his conquest of the East. The first ruled on the west so far as the Hydaspes, and when the Greeks attempted to cross that river, he prepared to dispute its passage at the head of a large force, and with more than 200 trained elephants. Alexander finally succeeded in eluding his vigilance, and forded the stream higher up. The battle that ensued was fought with desperate bravery on both sides, but the superior generalship of Alexander finally prevailed. Porus, who had maintained his ground to the last, was forced to flee after seeing two of his sons slain and being himself erely wounded. He was captured and ught before Alexander, who, struck by his rage and manly bearing, asked him what wished should be done for him. "That should deal with me as a king," said Po-. He was honorably treated by the Macenian monarch, and became his ally, accompying him in several expeditions. Alexander arged his dominions, so that they extended m the Hydaspes to the Hyphasis, and were d to include 7 nations and more than 2,000 ies. He was treacherously put to death Eudemus, who was left commander of the eek troops in that region. It is said that he s 5 cubits in stature.—His cousin of the same me ruled at the same time over Gandaris, of the Hydraotes. He fled on the approach Alexander, and his dominions were given to kinsman, to whom he had previously been stile.

POSEIDON. See NEPTUNE.

POSEN, a province and grand duchy of russia, bounded N. by West Prussia, E. by land, S. by Silesia, and W. by Brandenburg; ea, 11,568 sq. m.; pop. in 1858, 1,417,155. It as a very flat surface, abounding in lakes and arshes, and drained by a large number of reams, the principal of which are the Warta, branch of the Oder, intersecting it a little S. f the centre, and its affluent the Netze, which ows through the N.; the Vistula touches its N. E. border, and a branch, the Brahe, traverses a small portion of the same corner. Of the lakes the largest are the Goplo, Powidz, Sletsk, and Biala. The soil is generally very roductive; in some places it is light and sandy, ut most of it susceptible of cultivation, and the climate is temperate and healthy. It is e of the principal agricultural provinces of Prussia, and the forests supply large quantities of timber, much of which is exported. There are manufactories of woollen stuffs, linen, and leather, beside 203 breweries and 357 distilleries. The bulk of the population nsists of Poles, professing the Roman Catholic religion. Germans and Jews are numerous in the towns, the principal of which are, beside the capital, Bromberg, Gnesen, Lissa, Krotoschin, and Fraustadt.—Formerly this province formed part of Poland, but on the first partition of that kingdom in 1772 that part N. of the Netze was taken by Prussia, and at the second partition in 1793 it obtained the remainder. In 1807 it was incorporated by Napoleon with the duchy of Warsaw, but by the treaty of Vienna it was restored to Prussia. An insurrection concerted by the leaders of the emigrant Poles, and of which Mieroslawski was to have command, was suppressed in 1846, and the chiefs imprisoned until 1848, when they were liberated in consequence of the Berlin revolution. In the latter year it was, after an insurrection and severe struggle under Mieroslawski, united with the German confederacy, and separated in 1851 by treaty. It is divided into the districts of Posen and Bromberg.—Posen (Pol. *Poznan*), the capital, is a strongly fortified city on the river Warta, at the junction of the Glowna, in a sandy plain, 149 m. E. by S. from Berlin; pop. in 1852, 44,029. It is surrounded with a mound and ditch, and is protected by 6 forts, one of which, Fort Winiary, is of great strength. The city is entered by 4 gates, and has a town hall, built in the 16th century. There are a number of churches, a synagogue, several convents, a theatre, 2 gymnasia, a college, hospitals and asylums, and several schools. Linen, woollen, calico, leather, tobacco, &c., are manufactured. On the opposite side of the river is Wallischei, a suburb, in which is an old cathedral containing many ancient monuments. Posen became a bishopric in the 10th century, and in the 13th was the residence of the dukes of Poland.

POSEY, a S. W. co. of Ind., forming an extremity of the state, separated S. from Ky. by the Ohio and W. from Ill. by the Wabash river; area, about 400 sq. m.; pop. in 1860, 16,185. It has an undulating surface, a very fertile soil, composed in part of extremely rich bottom lands, and an abundance of coal. The productions in 1850 were 895,704 bushels of Indian corn, 21,245 of wheat, 30,259 of oats, and 17,667 lbs. of wool. It contained 6 saw mills, 2 tanneries, 1 newspaper office, 16 churches, and 1,000 pupils attending public schools. Capital, Mount Vernon.

POSIDONIUS, a Greek stoic philosopher, born in Apamea in Syria, probably about 135 B. C., died about 51. He studied philosophy at Athens under Panætius, visited Spain, Italy, Gaul, and Illyricum, and finally settled in Rhodes, where he became the head of the stoic school, was elected *prytanis*, and in 86 was sent as ambassador to Rome. He gave instruction to Cicero while the latter was in Rhodes, and was on friendly terms with Pompey, by whom he was twice visited. In 51 he removed to Rome, where he soon afterward died. None of his works have come down to us entire; the fragments extant were collected and published by James Bake under the title of *Posidonii Rhodii Reliquiæ Doctrinæ* (Leyden, 1810).

POSITIVISM, or POSITIVE PHILOSOPHY. See COMTE.

POSSE COMITATUS (Lat., the power of a county), the force of able-bodied male persons between the ages of 15 and 70, whom the sheriff by the common law is authorized to call to his assistance in case of invasion, rebellion, riot, breach of the peace, forcible resistance to process, &c., in the county or district in which he holds office. All persons included in the posse comitatus are bound, under penalty of indictment, to assist the sheriff when lawfully called upon, and are justified in killing a person in case of resistance. Unnecessary violence on their part, however, is punishable.

POST, a public establishment for the conveyance of letters, newspapers, &c. The Assyrian and Persian monarchs had their posts placed at stations a day's journey from each other, with horses saddled, ready to carry with the utmost despatch the decrees of the despot. In the Roman empire couriers on swift horses passed from hand to hand the imperial edicts to every province. Private letters were sent to their destination by slaves, or intrusted to casual opportunities. Charlemagne, it is said, established stations for couriers, who delivered small packets, letters, and decrees, from the court to every part of the realm; but after his death these stations were abandoned, and special messengers sent only when occasion demanded. In 1464 Louis XI. revived the system of mounted posts, stationing them at distances of 4 French miles apart, and requiring them to be ready night and day to carry government messages as rapidly as possible. Similar posts, the riders of which were called *nuncii*, were established in England in the 13th century. These were however exclusively for the transmission of government despatches. As late as the 15th century, butchers or drovers, who went about buying cattle, were the principal carriers of private letters. The only exception to this general custom in regard to private correspondence was the establishment in the 11th century, by the university of Paris, of a body of pedestrian messengers, who bore letters from its thousands of students to the various countries of Europe from which they came, and brought to them the money they needed for the prosecution of their studies. The great development of commerce following the crusades, and the geographical discoveries of the Italians, Portuguese, and Spaniards, created a necessity for business correspondence about the beginning of the 16th century. The royal *nuncii*, or post riders, had already found it for their advantage to use their surplus horses for the conveyance of passengers, and thus the system of posting, or travelling with post horses, came into vogue. These posts were now used for the carriage of private letters, at first irregularly, and without fixed compensation or regular periods of arrival or departure, but eventually with considerable order and system. The earliest of these posts for general accommodation in Europe was established in 1516 in the Tyrol, connecting Germany and Italy, by Roger, count of Thurn and Taxis. His successors received from the emperors of Germany repeated enfeoffments of the imperial post, and extended it over the greater part of Germany and Italy. Venice, Genoa, Leghorn, and Naples were thus connected with Hamburg, Bremen, Lübeck, and Frankfort-on-the-Main, and the active commerce which had sprung up between these cities was greatly facilitated. The counts of Thurn and Taxis retained this postal monopoly till the fall of the German empire, and even now the Thurn and Taxis post is maintained in 10 or 12 of the smaller German states, and supplies a district of 25,000 square miles and nearly 4,000,000 inhabitants. In 1524 the French posts, which had hitherto only transmitted the letters and messages of the king and nobles, were permitted to carry other letters. In 1581 Thomas Randolph was appointed chief postmaster of England, but his functions seem to have pertained more to the establishment and supervision of post houses, and the regulation of the fees for posting, than to the transmission of letters. In Peru, in 1527, the Spanish invaders found a regular system of posts in operation along the great highway from Quito to Cuzco, and messages as to the progress of the invasion, as well as other subjects, were forwarded to the inca by fleet-footed runners, who wound around their waists the *quipu*, a species of sign writing by means of knotted cords.—The complete organization of a system of postal communication in England did not take place till the reign of James I., who soon after his accession constituted the office of postmaster of England for foreign parts, and appointed Matthew Le Quester the first postmaster, with reversion to his son. Le Quester appointed William Frizell and Thomas Witherings his deputies. The latter eventually became postmaster-general, and in 1635 was ordered to establish a running post between London and Edinburgh, to go night and day, and come back in 6 days. In 1644 Edmund Prideaux, then a member of the house of commons, was appointed master of the posts, and first established a weekly conveyance of letters into all parts of the nation. In 1656 an act was passed to settle the postage of England, Scotland, and Ireland, fixing the rates of letter postage and the prices for post horses. The rates of postage previous to this act were for a single piece of paper: under 80 miles, 2*d.*; between 80 and 140 miles, 4*d.*; above 140, 6*d.*; and on the borders and in Scotland, 8*d.* The act of 1656 raised these rates (which were in all cases for a single letter) to 14*d.* for a distance of more than 800 miles, from which sum they were diminished according to the distance down to 2*d.* for 7 miles and under. Between this period and 1838 more than 150 acts relative to postal affairs were passed, but the rates of postage were not materially changed. These rates operated as an almost prohibitory tariff on letters through the mails, and all manner of devices for avoiding the payment of postage were adopted. The franking privilege, which at an early period had been granted to members of parliament and officers of the government, was much abused. Franks were sold openly. In 1838 the franked and privileged letters amounted to 30 per cent. of the whole number transmitted through the mails. In 1784 the net revenue of the post office did not exceed £150,000; but by the introduction of fast mail coaches soon after that date, it had risen in 1815 to about £1,600,000, at which point it remained stationary for more than 20 years, in consequence of the abuse of the franking privilege, and the methods adopted to evade the payment of postage. In 1837 the number of letters annually sent through the mails was 82,000,000; in 1859 it had risen to 545,000,000.

This extraordinary increase is the result of the entire change in the rates of postage, and the greatly improved facilities for the prompt transmission and delivery of letters, first proposed by Rowland Hill in 1837. Mr. Hill, who was not then connected with the post office department, broached his plan in a pamphlet on post office reform; it was adopted by parliament in 1839, and went into operation in 1840, under the supervision of its originator. Its principal provisions were: the reduction of all inland postage to a uniform rate (1*d.* for a single half ounce); the weight of a letter, and not the number of pieces, to form the basis of the rate; the entire abolition of the franking privilege; the despatch of the mails at more frequent periods; and increased speed in the delivery of letters. To these were subsequently added payment by stamps and prepayment. In 1848 the transmission of books by post was granted, at first at 6*d.* per lb. This was subsequently modified so as to give increased facilities for forwarding proofs, pictures, and indeed every thing except manuscripts and letters, at low prices. The rates to the colonies are also such as to encourage the transmission of letters and small packages thither by mail. Letter postage is 6*d.* per ½ oz. to the colonies; small packages, not letters, 3*d.* for 4 oz., 6*d.* for 8 oz., and 6*d.* additional for every 8 oz. or fraction thereof. These rates are increased ½ on packages or letters sent to Australia, New Zealand, Ascension island, or British India or China. The money order system, *i. e.*, granting certificates by the postmasters for a small percentage for sums under £5, payable by any other postmaster, was adopted in 1840; it was copied from the German post office system, where it had long been in practice. At first 5 per cent. was charged for these orders; but in about a year the commission was reduced to 3*d.* for sums under £2, and 6*d.* for sums under £5, and at these rates the amount remitted in the United Kingdom in 1859 was £13,230,930. In 1855 pillar letter boxes were introduced, and London was divided into 10 districts, for greater facility in the distribution of city letters. At first, under the new postage law, the English post office department did not pay expenses; but its net revenue has been gradually increasing, and is now considerably greater than under the old system. The number of persons connected with the postal service in England is about 25,000, of whom 6,000 are employed in the London district.—In France the carriage of letters and newspapers was farmed out, like most of the other sources of state revenues, from 1676 to 1791. The leases were for 6 years, and the rates of postage fixed. The revenue to the government rose, during that period, from 1,400,000 to 10,800,000 francs ($270,200 to $2,084,400) per annum. In 1791 the management of the department was resumed by the government, and variously modified during the revolution and the different governments which followed. Uniform rates of postage for inland and city letters were adopted in 1849, as follows: for letters within Paris, 2 sous (2 cents nearly) when the weight is under 15 grammes (not quite half an ounce), 4 sous if over 15 and under 30 grammes, &c.; for letters to or from other parts of France, Algeria, and Corsica, 4 sous if under 15 grammes, &c. If not prepaid, one half is added to these rates. Newspapers must always be prepaid, but throughout France the postage is only 1 sou, and if treating on questions of political or social economy only half that price. For foreign countries, the weight prescribed for single postage is 7½ grammes, or about ¼ oz. In 1859 the total number of French post offices was 3,703; the total number of persons employed in the postal service was about 28,000. In 1831 the receipts were 24,000,000 francs ($4,752,000); in 1859, 58,308,000 francs ($11,256,444). The number of letters conveyed by post in France in 1859 was 259,450,000; 90 per cent. of the whole number were prepaid.—In the English colonies which subsequently became the United States, a postal system was projected as early as 1692; but owing to the thinness of the population, it was not organized till 1710. By act of parliament of that year, the postmaster-general of the colonies was "to keep his chief letter office in New York, and other chief offices, at some convenient place or places, in other of her majesty's provinces or colonies in America." The revenue was for some years very small. In 1753 Benjamin Franklin was appointed postmaster-general for the colonies, and was guaranteed the sum of £600 per annum for the salary of himself and his assistant. He brought his usual executive ability to the work of remodelling and extending the operations of the office, and in a few years materially increased its revenues. He startled the people of the colonies in 1760 by proposing to run a stage wagon, to carry the mail from Philadelphia to Boston, once a week, starting from each city on Monday morning and reaching its destination by Saturday night. In 1774, while in England, Franklin was removed from office by the British government, in consequence of his exposure of the duplicity of Governor Hutchinson of Massachusetts, and his adherence to the cause of the colonies. In 1789 the constitution of the United States conferred upon congress the exclusive control of postal matters for all the states; and congress proceeded, immediately upon the adoption of the constitution, to organize the post office department, and to pass the necessary laws for the protection of the mails, &c. In 1790 there were but 75 post offices in the country, and the whole amount of postage received was $37,935, yielding a net revenue of $5,795 to the government; in 1800 the number of post offices had increased to 903, the amount of postage to $280,804, and the net revenue to $66,810. The rates of postage from the organization of the department until 1816 were: for a single letter (that is, one composed of a single piece of paper), under 40 miles, 8 cts.; under 90, 10 cts.; under 150, 12½ cts.; under 300, 17 cts.; under 500, 20 cts.; over 500, 25 cts. In 1816 these rates were modified as follows: A single letter carried not over 30 miles, 6¼ cts.; over 30 and under 80, 10 cts.; over 80 and under 150, 12½ cts.; over 150 and under 400, 18¾ cts.; over 400, 25 cts.; and an additional rate for every additional piece of paper, and if the letter weighed an ounce, 4 times these rates. Newspapers under 100 miles, or within the state where published, 1 ct.; over 100, and out of the state, 1½ cts.; magazines and pamphlets, 1½ cts. per sheet, under 100 miles, if periodicals; over 100, 2½ cts. per sheet; if not periodicals, 4 and 6 cts. As the facilities for transportation of the mails by steamboats, railroads, &c., increased, these high rates occasioned much dissatisfaction, and in various ways the law was evaded, and the postal revenue thus reduced. For several years letters were carried in large numbers by express between the principal cities, at rates much below those of the post office. The revenue reached its highest point in 1840 and 1842, being in the former year $4,539,265, and in the latter $4,546,246. From this point it receded. Even with this revenue the establishment did not pay expenses, there being a deficiency every year subsequent to 1837. The subject of a reduction of rates was repeatedly broached in congress, and measures for that purpose were proposed by Mr. Edward Everett in 1836; but no well digested plan was brought forward. In 1843 the general discontent of the people on the subject was expressed in the form of resolutions by the legislatures of several states, instructing their senators and requesting their representatives in congress to take some measures for a reduction. Mr. C. A. Wickliffe, at that time postmaster-general, made some investigation in regard to the English system, and in an elaborate report advocated some reduction, but not a radical one, on the ground that the department would become a heavy charge upon the government if a large reduction were made. A bill was drafted reducing the rates to 5, 10, and 15 cents for different distances; this bill passed the senate, but was lost in the house; the next year it was again brought forward, but again failed. In the next congress a new bill was presented, which became a law, March 3, 1845, and went into operation on July 1, 1845. Its rates were: For a letter not exceeding ½ oz. in weight, whether of one or more pieces of paper, under 300 miles, 5 cts.; over 300, 10 cts.; and an additional rate for every additional ½ oz. or fraction of ½ oz. Advertised letters, 2 cts. additional; drop letters, 2 cts.; circulars unsealed, 2 cts.; pamphlets, magazines, &c., per oz. 2½, and each additional oz. 1 ct. Newspapers under 30 miles, free; over 30 and under 100, or any distance within the state where published, 1 ct.; over 100, and out of the state, 1½ cts. Carriage by express was prohibited, unless the postage was previously paid. In the next congress an effort was made to raise these rates, as the postal revenue did not defray expenses; it was unsuccessful in regard to letter postage, but transient newspapers were charged 3 cts., and prepayment required: the postage on circulars was raised to 3 cts.; newspaper postage to Oregon and California was fixed at 4½ cts., and letter postage to the Pacific territories, *via* Chagres and Panama, at 4 In 1849 the postage on transient newspapers was reduced to ordinary newspaper rates, but prepayment still required. In 1851 another effort was made to raise the postage, which proved unsuccessful; but a law was passed establishing the following rates: For a single letter (of ½ oz. weight) under 3,000 miles, if prepaid, 3 cts., or if not prepaid, 5 cts.; over 3,000 miles, 6 or 12 cts.; to foreign countries, over 2,500 miles, except where postal arrangements have been made, 10 cts.; over 2,500 cts.; drop letters, 1 ct.; ship letters, 2 cts.; if delivered where deposited, 6 cts.; if sent through the mails, the ordinary postage is added. Weekly newspapers, to actual subscribers in the county where published, free; under miles and out of the county, 5 cts. per quarter; over 50 and under 300, 10 cts.; over 300 and under 1,000, 15 cts.; over 1,000 and under 2,000, 20 cts.; over 2,000 and under 4,000, cts.; over 4,000, 30 cts. Monthly papers and semi-monthly ½ these rates; semi-weekly double, tri-weekly treble, and oftener than tri-weekly 5 times these rates; newspapers under 300 square inches, ¼ these rates; if paid quarterly in advance, a deduction of one half to be made from these rates. Transient newspapers, circulars, and other printed matter, 1 ct. per oz. under 500 miles; over 500 and under 1,500, 2 cts.; over 1,500 and under 2,500, 3 cts.; under 3,500, 4 cts.; over 3,500, 5 cts. Books under 32 oz. in weight, 1 ct. per oz. if prepaid; if not, 2 cts. per oz. In 1852 the following modifications were made: Letters sent over 3,000 miles, and not prepaid, 10 cts. postage; newspapers, circulars, &c., under 3 oz., 1 ct. every additional oz. or fraction, 1 ct.; small newspapers and periodicals, published monthly or oftener, and pamphlets of not more than octavo pages, sent in single packages of not less than 8 oz., prepaid, ½ ct. per oz., or if not prepaid, 1 ct. Books, bound or unbound, less than 4 lbs., under 3,000 miles, 1 ct. per oz.; over 3,000, 2 cts. per oz.; 50 per cent. added when not prepaid. By the act of the same year, postage stamps and stamped envelopes were ordered. By a law passed March 3, 1855, and taking effect July 1 of the same year, the rates on single inland letters were reduced to 3 cts. for all distances under 3,000 miles, and 10 cts. for all over that distance; and all inland letter postage was to be prepaid. The charge for advertising letters was reduced to 1 cent. The only modifications since made in the law are those of 1860, establishing letter boxes on lamp posts, &c., in cities, requiring all letters deposited in them to be prepaid with a penny stamp to defray the cost of their carriage to the post office, and reducing the carriers' fee for the delivery of letters at their address to 1 cent per letter. Various attempts have been made to abolish the franking privilege, but hitherto without success. The right to frank letters and documents of any size is now granted to the president, ex-presidents, the vice-president, former vice-presidents, and the widows of Presidents Harrison and Polk. Members of congress and delegates from territories, from 30 days before the commencement of each congress until the first Monday in December after the expiration of their term of office, and the secretary of the senate and the clerk of the house of representatives during their official terms, can send or receive free letters weighing not over 2 oz., or public documents weighing not over 3 lbs. The governor of any state can send free the laws, records, and documents of the legislature to the governors of other states. The cabinet officers and their assistant secretaries, the commissioners of offices and heads of bureaus, the general-in-chief and adjutant-general, and the superintendent of the coast survey and his assistant, may send and receive free all official correspondence, but not their private letters or papers. The chief clerks in the departments may send free public official letters and documents. Deputy postmasters can send free all letters and packages relating exclusively to the business of their respective offices; and those whose compensation did not exceed $200 for the year ending June 30, 1846, may also send free all letters written by themselves, and receive free all letters addressed to them, not weighing over ½ oz. Exchange newspapers, magazines, &c., between editors, pass free. All publications entered for copyright, and which under the act of 1846 are to be deposited in the library of congress, pass free. Since the close of the war with Mexico and the annexation of California, the transportation of the mail to the Pacific coast has greatly increased the expenditure of the department, large subsidies having been paid during a portion of the time to the lines of steamships connecting with that coast, and of late very heavy sums for an overland mail. The importance of our relations to the Pacific states fully justifies these expenditures, though the amount of postage received does not defray them.—Postal treaties have been concluded with most of the countries of Europe, and through them letters can be forwarded to nearly every part of the world. The maximum postage of a letter weighing ½ oz. to any known port is 50 cts., and this only to Australia and New Zealand; the usual rates range from 15 to 30 cts., to which is to be added inland postage unless the letter is sent direct from a seaport. Letters not prepaid (except drop letters, where prepayment is optional) and letters advertised, but not called for, are forwarded after a sufficient time has elapsed to the dead-letter office of the post office department and there opened, and if containing any money or valuables the writers of the letters are notified, and the amount forwarded to them on application. Letters on which the address of the writer is written are returned unopened from the dead-letter office. The annual number of dead-letters is about 2,500,000; of this number 500,000 are drop letters, and 50,000 are held for postage; about 134,000 are from foreign countries, and are returned unopened. By the act of March 3, 1855, the postmaster-general was authorized to establish a plan for the registration of valuable letters, on the application of parties desiring it, and the payment of a registration fee of 5 cts.; but the government will not, like that of France, be responsible for the safe carriage of such letters or packets. The whole amount of postage received for registered letters in 1859 was $25,053. Only the states of Massachusetts, Rhode Island, and New York, and the District of Columbia, receive a larger amount of postage than is expended for the transportation of the mails and the compensation of those employed in the postal service.—The accompanying table gives a view of the comparative expenses, receipts, expenditures, and other statistics of the post office service in Great Britain, France, and the United States:

Particulars.	Great Britain.	France.	United States.	
	1859.	1859.	1859.	1860.
Population	28,883,597	36,746,482	31,279,885	31,279,885
No. of post offices	....	8,703	28,539	28,498
No. of persons employed in postal service	25,000	28,000	30,636	30,529
No. of letters transmitted	545,000,000	259,450,000	....	....
Whole amount of receipts	$15,842,842	11,256,444	8,665,484	8,518,067
Receipts for letter postage	....	$9,758,870	906,532	851,182
Newspaper postage	....	$772,000	589,852	627,037
Registered letters	....	....	$25,053	25,088
Stamps sold	....	$7,005,150	6,158,146	6,706,295
Whole amount of expenditure	$8,812,671	7,444,710	15,754,098	14,874,778
Expenditure for transportation	$2,918,830	....	7,157,629	10,510,608
Compensation allowed postmasters	$4,591,098	....	2,458,901	2,552,868
Extent of post routes in miles	129,480	....	260,052	240,594
Dead letters	1,700,000	2,734,498	2,500,000	....

POST, **Wright**, an American physician and surgeon, born in North Hempstead, Long island, Feb. 19, 1766, died at Throgg's Neck, June 14, 1828. He was a medical pupil of Dr. Bayley of New York for 4 years, and then went to London, where from 1784 to 1786 he studied under Dr. Seldon. Returning to America, he delivered a course of lectures on anatomy in Columbia college, and in 1792 was made professor of surgery in that institution.

He went to Europe immediately after the appointment, and visited all the great medical schools, and on his return in 1798 resigned the professorship of surgery and became professor of anatomy and physiology. This office he held 20 years, during which time he became widely known by his skill in performing many delicate and difficult operations. In 1813 he was made professor of anatomy and physiology in the college of physicians and surgeons in New York, and in 1815 made another visit to Europe. In 1821 he was elected president of the college of physicians and surgeons, which office he held 5 years.

POTASH, or POTASSA, a term variously applied to several compounds formed by the metallic base potassium, and other elements. In chemistry it is used to designate the protoxide (KO), consisting of one equivalent each of this base and of oxygen, and this is the ingredient in the compounds, hydrate, carbonate, nitrate, sulphate, &c., of potash, combinations respectively of this substance with water, carbonic acid, nitric acid, and sulphuric acid. The hydrate of potash ($KO\,HO$), also known as caustic potash, is sometimes called simply potash, as are in the arts and commerce the crude carbonate and hydrate from which most of the other compounds are prepared.—Potash, the protoxide of potassium, is of itself of little interest or importance. It is obtained as a white powder when the metal potassium is exposed in thin slices to dry air. At a red heat it fuses, and at higher temperatures is volatilized. In contact with water it ignites and forms a fusible hydrate, which is also known as caustic potash. This compound is of great importance in the arts, chemistry, and pharmacy, not only as the base of numerous useful salts, but for its own independent properties. It is commonly prepared from the carbonate, a solution of which in 10 to 12 parts of water is boiled with about an equal quantity of freshly slaked lime, made in a paste with water, and gradually added to the solution. The boiling is performed in a clean iron vessel, and is continued for about half an hour. The lime seizes the carbonic acid of the carbonate of potash, and leaves the hydrate of potash in solution; and the operation is found to be complete when no effervescence is observed on taking out a portion of the liquid and adding a little hydrochloric acid. It may then be drawn off in part from the calcareous sediment, and the remaining portion be recovered by filtering through a cotton filter, protected as much as possible from the air, by which it might again be partially carbonized. The clear solution is now evaporated rapidly in a polished iron or silver vessel, till it becomes of an oily consistence and hardens on cooling. Before it is allowed to cool it is usually run into cylindrical moulds, and thus is formed in sticks, which are the caustic potash or *potassa fusa* of the pharmacopœia. It contains impurities, as sulphate and carbonate of potash, chloride and peroxide of potassium, oxide of iron, and alumina, from most of which it may be freed by dissolving in absolute alcohol, evaporating, and again fusing. Hydrate of potash may be economically separated from some feldspars and micas by calcining the minerals with lime and leaving the products for some time in contact with water. According to Fuchs, 19 per cent. of potash may thus be obtained from feldspar, and 15 per cent. from mica. The pure hydrate is a white solid substance, of crystalline fracture, and specific gravity 1.7. It is very deliquescent, dissolving readily in water, the solution of specific gravity 1.68 containing 51.2 per cent. of the alkali and boiling at 329° F. It fuses at a low red heat, and at a white heat it volatilizes without separation of the water. It has an acrid taste and corrosive action upon the cuticle, dissolving and decomposing organic tissues. It is the most powerful base known, and is hence largely employed for decomposing saline compounds, the acids of which it seizes. It absorbs carbonic acid from the atmosphere, and must consequently be preserved in glass-stoppered bottles, and the glass of these must be free from lead. Mixed with the fat oils it forms soaps; and in various other ways it is a most useful article in the arts, in chemistry, and to some extent in medicine. The pharmaceutical preparation known as *liquor potassæ* is a solution in water of the hydrate of specific gravity about 1.05, and containing 4.7 per cent. of potassa. Its properties as an antacid, &c., are however as conveniently serviceable in the carbonate of potash. In excessive doses its poisonous action is neutralized by vinegar, the milder acids, or the oils.—Commercial potash, the crude carbonate and hydrate, is wholly obtained from wood ashes, and is the chief portion of the soluble matters which these contain, except when made from plants that grow near the salt water. In these the potash is more or less completely replaced by soda, so that they are used to produce this alkali in the same manner that other plants afford potash. The alkalies that exist in the soil are derived from the decomposition of different rocks and minerals. Feldspar and mica, ingredients of granite, are particularly prolific sources of potash and soda. They cannot, however, be made to yield these alkalies so economically as the plants, which have taken them up in their sap and hold them in a soluble state, combined with oxalic and tartaric and other vegetable acids, and also with silicic and sulphuric acids. By burning the plants, the salts of the vegetable acids are decomposed, and the potash combines with carbonic acid, remaining with the ashes as a carbonate. The ashes, moreover, contain as soluble ingredients carbonate of soda, the sulphates and silicates of potash and soda, and chlorides of the metals, including chloride of potassium; and beside these, insoluble earthy matters, which are of no value in connection with the production of the alkalies. The proportion of these two classes of ingredients varies in ashes obtained from different plants and their parts, ranging generally from $\frac{9}{10}$ to $\frac{4}{5}$ insoluble, and consequently leaving $\frac{1}{10}$ to $\frac{1}{5}$ soluble. Berthier found the soluble portion of the ashes of oak wood to amount to 12 per cent., of white beech wood 19.22, red beech 16.8, birch wood 16, fir wood 25.7, fir charcoal 50, pine wood 13.6, wheat straw 10, and potato vines 4.2; and other chemists report the ashes of bean vines to contain 33 per cent. of soluble matter, of pea vines 27.8, of rye straw 19.47, &c. The branches and bark contain more saline matters than the solid wood, a distribution perhaps dependent on the potash existing chiefly in the sap. Tables presenting these values are contained in the treatise on this subject in the first volume of Dr. Knapp's "Chemical Technology," translated by Drs. Ronalds and Richardson. A table is also found there giving the proportions of ash found by different chemists in various plants and in their different portions. See also a table of M. Violette in the article FUEL, vol. vii. p. 780, representing among other ingredients the quantity of ash in different parts of the cherry tree. The whole amount of ashes from the solid wood of trees generally falls short of 1 per cent. of the whole weight, but sometimes exceeds this 2 or 3 times. The bark often produces 6 per cent. of ashes; and vines, straw, &c., still larger proportions. Thus potato vines have given 15 per cent.; pea vines to different experimenters 5, 8, and 11 per cent. respectively; wheat straw 4 to 7 per cent.; corn stalks 12 per cent., &c. The proportions of potash actually separated from different plants are given as follows by Vauquelin, Pertuis, Kirwan, and De Saussure:

	Per ct. of potash.		Per ct. of potash.
Pine or fir	0.045	Large rush	0.725
Poplar	0.075	Corn stalks	1.750
Beech wood	0.145	Bean stalks	2.000
Oak	0.153	Bastard chamomile, anthemis cotula, L.	1.960
Box wood	0.226	Sunflower stalks	2.000
Willow	0.285	Common nettle	2.500
Elm and maple	0.390	Vetch plant	2.750
Wheat straw	0.390	Thistles in full growth	3.500
Bark of oak twigs	0.424	Dry wheat straw before earing	4.700
Thistles and flax stems	0.500	Wormwood	7.300
Small rushes	0.508	Fumitory	7.900
Vine shoots	0.550	Angelica	9.620
Barley straw	0.580		
Dry beech bark	0.600		
Fern	0.626		

The stalks of tobacco, potatoes, beet leaves, tansy, sorrel, &c., contain large proportions of potash, and the removal of such products every year from the soil must cause its impoverishment, unless the potash is restored in other ways.—When ashes are treated with water a strongly alkaline solution is produced called a lye, and when this is drawn off and evaporated to dryness the soluble salts remain behind. The evaporation used to be conducted in iron pots, and hence the name potash. The manufacture is largely carried on in several wooded countries, especially where it is desirable to clear off the forests for agricultural purposes; but it appears to be northern countries alone that produce supplies for commerce. These are the northern American states and Canada, and Germany, Russia, and the other countries of the north of Europe. Various other vegetable productions beside forest trees are consumed for producing potash, and, as will be seen from the above table, some of them, as the herbaceous plants especially, afford a much larger proportion of ash than the solid wood of trees. Straw, among articles that are readily procured in large quantities, is particularly productive, and in Russia it is burned together with weeds for potash. In France the lees of wine and other refuse of the distilleries and vineyards furnish an abundant source of potash; and in Java it is obtained from the stems and leaves of the indigo plant after the coloring matter has been extracted. The method pursued in the American forests is to burn the wood in large heaps to ashes. Barrels sawed across in the middle furnish tubs, which are provided with a false bottom perforated with holes and supported upon cross sticks a little above the real bottom. Straw is laid upon the false bottom, under which is a cock for letting off the lye. The ashes mixed with about $\frac{1}{5}$ of lime are now placed in the tubs and drenched with successive portions of water, which are allowed to remain for an hour or two. Those first drawn off, being saturated with the soluble salts, are conveyed directly to the evaporating pans; but the succeeding portions, being weak, are retained to use again upon fresh ashes. The pans are of iron, broad and shallow, and with corrugated bottoms to increase the heated surface. When the liquor becomes of sirupy consistence the heat is checked, and the contents of the pan soon solidify. These when cold are dug out with some difficulty and placed aside as crude potashes. They are intensely alkaline, and of a reddish brown color from the carbonaceous matter they retain. They are afterward purified by heat on the floor of a furnace, losing most of the sulphur that may be present, the excess of water, and other volatile matters, the whole loss amounting to 10 or 15 per cent. The product is white, of a bluish or pearly cast, contains a larger proportion of carbonic acid than the crude article, and is known as pearlash. The effect of the lime added to the ashes is to decompose the sulphate of potash found among the salts of the ashes and recover the potash, while the sulphuric acid is rendered insoluble by combination with the lime, and is retained with this portion of the ashes. Crude potash and pearlash are both somewhat variable in composition. The former contains a large portion of caustic or hydrate of potash, and its percentage of absolute potassa often amounts to 60. In the latter the potash is in the condition of a carbonate, representing a percentage of about 50 of absolute potassa. The commercial value of the article is determined by the amount of acid required to neutralize the alkaline reaction of a known weight of the salt, as described in the article Alkalimetry. Graduated instruments, called alkalimeters, are in use for facilitating this operation, and various modifications of the process are given in the chemical works. Pearlash is purified by dissolving it in one and a half times its weight of water, applying a gentle heat, and then drawing off the solution from the salts that settle in the bottom. The liquid is rapidly evaporated by heat, and as it is allowed to cool and begins to crystallize it is kept in agitation so that only small crystals of nearly pure carbonate of potash may form. The solution obtained by treating the bitartrate of potash (cream of tartar) with water filtered and evaporated, affords still purer crystals of carbonate. Crystallized carbonate of potash contains two equivalents of water, and is represented by the formula KO CO_2, 2HO. The dry anhydrous salt is very deliquescent, attracting water till it becomes liquid; it fuses at a red heat, and dissolves in less than its weight of water. It is not soluble in absolute alcohol. It consists of one equivalent of carbonic acid, 22, and one of potassa, 47.2 = 69.2. In the chemical arts carbonate of potash is largely employed to neutralize acids, also as a flux, and to form the other salts of potash. In medicine purified pearlash, often called salt of tartar, is variously employed—sometimes as an antacid, also as a diuretic and antilithic. For cutaneous eruptions it is one of the most effectual remedies, and is employed both internally and externally. The pure carbonate, prepared from cream of tartar, and formerly known only as salt of tartar, is to be preferred to purified pearlash for the preparation of citrate of potassa, known as the neutral mixture or effervescing draught, an excellent refrigerant diaphoretic, very generally administered in remittent and other fevers. —Various other salts of potash are extensively employed in the arts and also in medicine. Among the most important of these are the nitrate, saltpetre (see Nitre), the chromates (see Chromium), the bitartrate (see Cream of Tartar), the hydriodate and prussiate (see Potassium), the chlorate (see Chlorates), and sulphate. Sulphate of potash (KO, SO_3) is obtained in anhydrous crystals of the form of 6-sided prisms terminating in 6-sided pyramids, or in oblique 4-sided prisms, by neutralizing with carbonate of potash the bisulphate of potash that remains in the manufacture of nitric acid from nitre. The crystals are unalterable in air, and the salt is one of the least soluble of the neutral salts of potash, requiring about 10 parts of cold or 4 parts of boiling water to dissolve it. In alcohol it is insoluble. Its use is in medicine, its properties being those of a mild purgative. The hydrated bisulphate (KO, SO_3+HO, SO_3), the residue in the preparation of nitric acid from nitre, the *sal enixum* of the alchemists, is obtained in a white crystalline mass. It crystallizes from a strongly acid solution in rhomboidal tables. The salt dissolves readily in water, but is in part decomposed by it, and a portion of sulphate of potash is deposited. The use of the bisulphate is as a flux in chemical operations requiring the action of an acid at high temperatures on salts or metallic oxides with which it may be fused.

POTASSIUM, the metallic base of potash, symbol K (*kalium*), chemical equivalent 39. That the alkalies and earths were of compound nature had been for some time suspected before Sir Humphry Davy, in 1807, demonstrated the fact in regard to this alkali, a discovery which was soon followed by the resolution of the other compounds referred to into their constituents of oxygen and a metal, and the important modifications in chemical science involved in these great discoveries. He effected the decomposition by employing the hydrate of potash, moistened on its surface by exposure to the air for a short time, and subjecting this to the action of a galvanic battery of 200 pairs of 4-inch plates. Previous attempts to decompose the potash in solution in water had failed on account of the voltaic current acting upon the fluid rather than the alkali; the dry hydrate, being an insulator, was not affected by the current. Globules of potassium appeared at the negative pole, and bubbles of oxygen at the positive. The metal thus obtained was very small in quantity, and on account of its great affinity for oxygen it was found necessary to protect it from both air and water, either in mercury, with which it formed an amalgam, or in naphtha. The next year Gay-Lussac and Thénard succeeded in decomposing melted hydrate of potash by causing it to pass through a gun barrel, which contained iron filings and was kept at a white heat. The oxygen of the potash and of the water it contained was taken up by the iron, and the potassium set free passed through and was condensed in a cool receiver of copper. The method now employed to produce potassium is that invented by M. Curaudau and improved by M. Brunner, and particularly described in the *Annales de chimie* (iii.), xxxv. p. 144. The reducing agent in this process is charcoal, and to obtain it in the most efficient form and most intimately mixed with the potash, cream of tartar (bitartrate of potash) is employed and ignited in a closely covered iron crucible, till it ceases to emit combustible vapors. The operation is facilitated by the intermixture of about 10 per cent. of coarsely pulverized charcoal, which keeps the mass open and permits the gases to escape. As the vegetable acid decomposes, its carbon is left intimately mixed with the resulting carbonate of potash, giving the product a black color. The crucible is cooled rapidly by cold water applied to the outside, and the contents broken into small pieces are introduced into an iron bottle, as a quicksilver flask, which is provided with a discharge tube, also of iron, and placed horizontally in a furnace. The discharge tube is of good capacity, and is made of the least possible length to enter the receivr, which is placed close up to the iron plate of the furnace. These precautions are necessary on account of the danger of the tube becoming obstructed by the accumulation of potassium. When the retort is raised to a red heat, it is sprinkled over with vitrified borax, which melts and protects the iron from oxidation. The fire is then urged to obtain a most intense heat, and after a time greenish vapors of potassium appear at the end of the tube, bursting as they mix with the air into a brilliant flame. The receiver already prepared is now adjusted to the tube. It is constructed in such a manner as to be kept cool, while the tube from the bottle is red-hot, and at the same time to exclude the air from without. In one form it consists of two cylindrical vessels of sheet copper, the upper one set with its open end down into the lower one, to which it serves as a cover. The connecting tube enters it near the top through a closely fitting socket of copper, and by the interposition of a partition or diaphragm, which divides the upper receiver into two parts, all the products of the distillation are forced to descend within two inches of the bottom, where some rectified petroleum catches the potassium as it falls drop by drop from the end of the tube. Carbonic acid also comes over, and passing under the diaphragm escapes through a glass tube inserted for the purpose near the top of the receiver. To prevent the connecting tube from becoming clogged with potassium, an opening is made directly opposite to it on the other side of the receiver, and also through the diaphragm between, by which an iron wire can be used to remove the obstructions. The receiver is kept cool by means of ice placed in a wire cage that is set over the upper portion; and the lower part may also be set in ice. Another form of receiver is that of an iron box a foot long, 5 inches wide, and only ¼ inch deep. It is made of two pieces of wrought iron, the pan below and its cover, which are clamped tightly together. One end has a short neck with an aperture large enough to receive the connecting tube, and the other is open the whole width of the box. The apparatus is kept cool by a wet cloth placed upon it. The potassium condenses immediately in the box, and the carbonic acid gas passes out at the open end. Through this end an iron rod is introduced when necessary to remove any obstructions in the tube; but if this should become closed the fire must be immediately withdrawn by removing the bars that support it. As soon as the gases cease to flow the receiver is removed and instantly plunged into a vessel of naphtha, which is then covered tight and immersed in water. When cold, the potassium is detached from the receiver and preserved in naphtha. It is not safe to keep it except it be purified by a second distillation; but before the connecting tube is used again it should be washed in water to remove the impure potassium that collects in it. A smaller iron bottle may be used the second time with a bent tube terminating in naphtha contained in a capacious flask. It may also be purified by squeezing it under naphtha through a piece of linen with wooden pliers. Potassium is a silver-white metal, at ordinary temperatures soft like wax, toward the freezing point malleable, and at this point brittle and sometimes crystallized in cubes. At 70° it is semi-fluid, and at 150° it is liquid. Its density at 60° being only 0.865, it floats upon water; and thus placed its strong affinity for oxygen is remarkably exhibited. The water is decomposed, and great heat is evolved, so that the potassium takes fire, and the hydrogen of the decomposed water also burns with it. The metal darts rapidly about upon the surface, accompanied by a brilliant flame, till at last, cooling down sufficiently to come in contact with the water, it disappears with an explosive burst of steam. Exposed to the air, potassium soon becomes covered with a film of the protoxide, and when heated till it begins to form vapor it takes fire and burns with a violet flame. The product of this combustion is the peroxide, KO_3.—The most important salts of potassium are the iodide, also known as hydriodate of potash, and the combinations of the metal with cyanogen. Iodide of potassium (KI), much used as a medicine, is prepared by several methods which are given in the pharmacopœias. One of these is to dissolve iodine in a strong solution of potash, whence results iodide of potassium and iodate of potash in colorless solution. When so much iodine is taken up as to give its color to the liquid, this is evaporated to dryness and cautiously brought to a red heat. The iodate is thus converted into the iodide, which fuses, and if too strongly heated volatilizes. It is next dissolved in water, filtered, and crystallized. It takes the form of cubes or rectangular prisms, which are generally white and opaque, and have an alkaline reaction from a trace of carbonate of potash. The salt, commanding a high price, is often adulterated. If pure, it should not effervesce nor turn brown on addition of hydrochloric acid, the former effect indicating the presence of carbonate of potash, and the latter of iodate of potash. It should dissolve completely in 6 times its weight of alcohol. The chlorides of potassium and sodium and the bromide of potassium are also often found in this salt, and the last named is sometimes fraudulently substituted for it. The presence of a chloride is detected by nitrate of silver producing a precipitate that is readily soluble in ammonia. Bromide of potassium may be distinguished from the iodide by its giving no precipitate with bichloride of mercury. This salt is variously employed in medicine, and its effects upon the secretions, when administered as an alterative, are very marked. It may be regarded as an antidote to the poisonous effects of lead and mercury which remain fixed in the tissues. These, being converted by it into iodides, are rendered soluble and pass off. When exhibited in connection with certain compounds of mercury, it has been observed to increase the activity of these medicines in a remarkable degree, probably by making them soluble. As an antidote to the poison from the bites of venomous reptiles, its properties have been alluded to in the article POISON. The salt passes quickly into the urine, in which it has been detected in 6 minutes after swallowing. It is employed externally as an ointment, either alone or mixed with iodine.—The compounds of cyanogen and potassium present 3 or 4 very important salts: the ferrocyanide, also known as yellow prussiate of potash, the sesquiferrocyanide or Prussian blue, the ferridcyanide or red prussiate of potash, and the cyanide of potassium. The first named, from which the others and all the other compounds of cyanogen are derived, is manufactured upon a large scale by calcining at a high temperature nitrogenous animal matters, as dried blood, hoofs, horns, parings of hides, woollen rags, refuse of tallow chandlers, and other such substances, with an equal weight of carbonate of potash and about $\frac{1}{8}$ their weight of iron filings, in a covered iron pot; or the filings may be in part or wholly omitted, in which case the pot itself and the stirrers used furnish the required amount of iron. A dark gray mass is obtained, which being treated with hot water yields what was formerly known as the *lixivium sanguinis* or blood lye. This being evaporated produces impure lemon-colored crystals of prussiate of potash. By redissolving and crystallizing by long continued evaporation, they are obtained again perfectly pure in large tabular forms, transparent, and of composition represented by the formula K_2, $Fe\ Cy_3 + 3HO$. The salt is very soluble in water, but is insoluble in alcohol; it has a saline bitterish taste, and has not the poisonous properties of some of the cyanogen compounds. It is tough and not readily reducible to powder. Heated to 212° F., it loses its water of crystallization, amounting to 12.6 per cent. of its weight, and crumbles to a white powder. At a red heat in close vessels it fuses, and finally decomposes in part, nitrogen escaping and cyanide of potassium and carburet of iron being formed. By the admission of air the cyanide is converted into cyanate of potash. The uses of this salt are numerous and very important. In dyeing and calico printing it is the source of some of the colors employed, especially the blues. In chemistry it is a reagent in the wet way for distinguishing metals in solution from each other. The precipitates it occasions in acid metallic solutions are generally combinations of the cyanide of the metal thrown down with cyanide of iron, and the metal is recognized by the peculiar color of the precipitate; thus with salts of copper the precipitate is reddish brown, with salts of cobalt yellowish green, with protosalts of iron white changing to blue, with persalts of iron a deep blue, &c. Thus are obtained some of the colors used in dyeing. In metallurgy this salt is used as a flux, and also in the manufacture of steel from wrought iron, to which when melted together it imparts the carbon necessary for the conversion. It has also recently come into general use for increasing the hardness of steel upon the face of which it is melted. In pharmacy it is used to prepare diluted hydrocyanic acid, Prussian blue, and the cyanides of potassium and silver. In medicine it is found to possess the properties of a sedative, diaphoretic, and astringent, but is little used.—The sesquiferrocyanide of potassium, or Prussian blue, is a pigment of great value discovered in 1710 by Diesbach, a color maker at Berlin, and the first account of its manufacture appeared in 1724 in the "Philosophical Transactions." The salt is the precipitate obtained by mixing a solution of a persalt of iron with one of ferrocyanide of potassium, and its composition is represented by the formula Fe_4, Fcy_3. The iron salt usually employed in its preparation is the green vitriol, sulphate of the protoxide, which before mixing with the potash solution is converted into peroxide. It is used on account of its cheapness, but the nitrate is much better adapted for producing the finest sorts of Prussian blue; for the sulphate is rarely deprived altogether of the protoxide salt, and any portion of this remaining produces a blue of inferior quality. Such is the basic or soluble Prussian blue, distinguished from the genuine blue by its character of solubility in water. The character of the products is also materially affected by that of the ferrocyanide of potassium employed. The best, such as the Paris blues, are made with this salt purified by successive crystallizations, while the more common sorts are made from the crude solution before crystallizing, and the inferior sorts even from the mother liquors from which the salt has been crystallized and separated. As all ferrocyanide of potassium except the purest contains some carbonate of potash, this must be neutralized, and for this purpose sulphuric acid is added either to the iron or potash solution. But in making the common Berlin blues a solution of alum is employed; this involves a precipitate of alumina, which becomes mixed with the color, and adds essentially to its weight. Sometimes chalk, plaster of Paris, and starch are purposely introduced as adulterants. The method of manufacture recommended by Liebig is to divide a solution of 11 parts of green vitriol into two portions, and mix one of these with two parts of hydrochloric acid, gradually adding to the mixture chloride of lime until the whole of the protoxide is converted into peroxide. Then the two portions are to be mixed together, and a solution of 10 parts of ferrocyanide of potassium added. The blue precipitate thus obtained is not, however, perfectly pure. Various other processes for making this color are in use. Prussian blue is usually prepared for sale by drying the precipitate in cubical or irregular shaped masses;

but as these are not afterward readily reduced to the fine state of division of the precipitate, this is sometimes sold to the manufacturers of paper hangings in the form of a paste. The dried color breaks with a dull fracture, but when rubbed presents a beautiful reddish metallic lustre like bronze, and altogether bears much resemblance to indigo. It has neither taste nor smell, and is not soluble in water nor weak acids; but washed with dilute hydrochloric acid and then rubbed with ⅛ its weight of crystallized oxalic acid, it is rendered soluble. A fine blue writing ink is prepared by dissolving this mixture in 40 or 50 parts of water. Prussian blue is decomposed by the alkalies and their carbonates, oxide of iron being liberated and a ferrocyanide of the metal remaining in solution. The addition of potash thus reproduces the yellow prussiate, and is an excellent method of preparing this salt in a state of purity. Prussian blue when heated in the open air takes fire and burns like tinder. Its use in the arts is as a pigment. It makes a beautiful water color, which however is not very permanent. It is also of value in dyeing and calico printing. Starch is colored by it, and it forms the "blueing" for coloring linen. In medicine it is sometimes used for its properties as a tonic, febrifuge, and alterative, and also externally as an application to ulcers, mixed with some simple ointment.—The ferricyanide of potassium, or red prussiate of potash (K_3 Fe_2 Cy_6), is also a valuable salt, both as a reagent in chemical analysis and in calico printing. It is obtained in splendid ruby red crystals on evaporating a dilute solution of ferrocyanide of potassium through which a current of chlorine has been passed just to the point when the liquid ceases to give a blue precipitate with the persalts of iron. As it is prepared on a large scale for the calico printer, it is generally obtained by decomposing the solid yellow salt by means of chlorine. The red crystals left from the solution are anhydrous; they are soluble in less than 4 parts of cold water, and in still less hot water. The solution of the salt is used as a test for various metals, producing in their solutions differently colored precipitates. Thus the protosalts of iron are recognized by the beautiful Prussian blue color, the salts of nickel and of copper by yellowish green, of cobalt dark reddish brown, cadmium yellow, zinc and silver orange, manganese bronze, &c.—Cyanide of potassium (K Cy) is a salt largely prepared for various uses in the arts. In electro-gilding it is added to the solution of gold to give it clearness and prevent the deposition of a black deposit; in photography it is used to fix the image upon the plates; in metallurgy it is a powerful reducing flux for the oxides of the metals; and in pharmacy and medicine it is a substitute for hydrocyanic or prussic acid, having the same poisonous qualities. (See HYDROCYANIC ACID.) It is prepared from a mixture of 8 parts of carefully dried and pulverized ferrocyanide of potassium and 3 parts of carbonate of potash, to which may be added one part of charcoal, brought to a red heat in a close iron crucible. When the yellow color disappears and no more bubbles of gas are seen, the fused cyanide is poured off from the ferruginous residue. If no charcoal is added the product is milk-white, and contains cyanate mixed with the cyanide; but if charcoal is used to reduce to cyanide the cyanate that forms, the fused salt when poured out is black and must be freed from the particles of unconsumed charcoal that color it. This is done by treatment with boiling alcohol, and filtering; the salt separates by crystallizing when cold. This treatment is unnecessary if the salt is designed for forming and dissolving the cyanides of gold and silver, or for electro-metallurgical purposes. The crystals of cyanide of potassium are colorless cubes, which become opaque and deliquesce in damp air, and are very soluble in water. The solution has the odor of hydrocyanic acid. Preserved in a tight bottle, the dry salt may be kept for a long time without losing its properties, and for this reason it is to be preferred to the acid poison. As it is sold, it is, however, of very uncertain purity, commonly containing water, the hydrate, carbonate, cyanate, and formiate of potash. The carbonate is the chief impurity, and altogether sometimes makes half the weight of the salt.

POTATO, an esculent tuber produced by the *solanum tuberosum* of Bauhin and Linnæus. The genus *solanum* is the type of the natural order *solanaceæ*, composed of exogens with 5 free stamens, a monosepalous hypogynous corolla divided at top into 5 lobes, and a 5-parted calyx, persistent, inferior; the æstivation plaited, imbricated, or valvate; the fruit either a capsule or a berry; the leaves alternate, undivided, or lobed. They are natives of most of the warmer portions of the world, especially the tropics. Many genera beside the typical one belong to this order, several of which consist of poisonous plants, and others are of importance in medicine. The genus *solanum* contains plants of the herbaceous, shrubby, and tuberous-rooted esculent kinds, of which may be mentioned the tomato, egg plant, bittersweet, winter cherry, the nightshades, and the potato. There are two principal variations of this last, as shown in the color of its tubers, viz., those in which they are red, blue, or purple, and those in which the white or yellow is the prevalent tint; and the sub-varieties under these colors are exceedingly numerous. When raised from seeds, no permanency in form, color, general characteristics, or qualities can be anticipated. A good variety having once originated, it can only be secured by propagation in some other way. Instances are on record where, out of 500 seedlings, not one was like the parent, and only 3 of the entire number worth perpetuating. In order to procure the seeds for sowing, the berry-like fruit, or potato ball as it is termed, should be gathered when it is perfectly ripe and dried, and the seeds rubbed out with the hand. They should be kept in some dry place until the next spring, and then sown in shallow boxes in a good pulverized soil. When 4 or 5 inches high, the young plants should be carefully transplanted into properly prepared beds, allowing 6 inches space for each plant, and keeping the beds clear of weeds. At the end of the season small tubers will be found on the roots of every plant, which must be stored through the winter and planted out the next spring. At the end of the second year some idea of their value can be obtained. By such experiments a few superior sorts can be produced, and these perpetuated by the usual modes of planting.—Different modes of raising potatoes prevail in different parts of the world. In Europe the tubers are carefully cut into small bits, each having an "eye" or stem bud. In Ireland it is not unusual to cut these early in winter and save them until the period for planting; by this means the cut part has time to dry and harden on its surface, and is not so liable to rot if planted in moist soil. These fragments are called "sets," a term also applied to the entire tuber used in planting. All the kinds of potato will grow in almost any soil, but prefer a moderately light and dry one and an open situation. There are various modes of planting. In the dibbling method, small holes 4 or 5 inches deep and 12 inches apart are made by a blunt-pointed tool, and a simple cutting or set being dropped into the hole, the surface of the ground is smoothly raked over. The drill method is by the use of a hoe, the drills being 4 or 5 inches deep and 2 feet apart; into these the sets are dropped at proper distances and covered with about 4 inches of earth. The spade is used in furrow planting. In light ground a system of trenching to a spade's depth is practised; and in very wet lands the soil is thrown up into high broad beds with deep alleys between, the sets being dropped upon some littery manure and covered with earth taken from the alleys. In harvesting, the potatoes are lifted out by a blunt-pointed 3-pronged fork, the haulms or dead tops being burned upon the ground or removed for litter or for covering used in garden purposes. The potato is sometimes forced by selecting dwarf kinds and planting in a hot-bed very early in the year. For early crops, drills 2 feet apart and 7 or 8 inches deep should be formed in some warm and sheltered situation. Half decomposed stable dung is laid in the drills and mixed with the soil, and a covering of mould laid to within 4 inches of the surface. The sets should be uncut, the upper or crown end of the tuber uppermost, and placed in the drill, with about an inch of mould strewn over them, and occasionally a sifting of wood ashes. The sides of the drills are lined with dry leaves to guard against frosts.—The process in the United States is less diversified, the potato being more generally regarded as a field crop. It is considered advisable to plough the land deep and to break it up with the hoe. When greensward is used just before planting time, the latter precaution is not so necessary. Manures that will lie lightly are found advantageous, and next to these, kinds that ferment slowly. Next in value to a new soil is the use of old salt hay or oak leaves, and similar vegetable matter always at hand. New lands recently burned over also produce excellent potatoes. As a crop the value in a commercial view depends less on the quantity raised than on the quality of the tubers. The higher the land is manured, the greater the quantity, but not always the better the quality. In the northern and eastern states the time of planting may be from May 1 to the end of June; but sufficient time should be allowed for the foliage and stems to come to maturity and ripen, otherwise the tubers will not be well grown. In preparing the sets or seed potatoes, as they are often called, some advise cutting into small pieces, and others planting entire and large tubers. Where the ground is rough and stony, the older method of planting in hills may be as good as any; but in rich and mellow soil the drill method is preferable. This can be done in an expeditious way by cutting furrows with a horse plough, dropping the sets, and covering them by passing the plough along the back of each furrow, and levelling afterward. When the crop is ready for hoeing, the cultivator may be employed between each furrow, weeding the plants and keeping the soil loose and mellow around them, avoiding too much hilling up. On harvesting the crop, exposure to the sun's rays should be avoided; it should be housed as soon as convenient in cellars or caves dug in a dry soil, and protected from frost and light. Toward spring the sprouts are to be removed and the potatoes kept dry for table use.—The potato differs in shape of the tuber, in foliage, flowers, and prolific qualities. The leaves of some resemble those of the ash tree, and these are called the ash-leaved sorts. The blossoms are white, violet, or pale, and the tubers are in shape globular, kidney-shaped, flat, long cylindrical, tapering, curved, conical or pineapple-shaped, and imbricated; their exterior is smooth, rough, granulated, or warty, and in color white, yellow, pink, purple, blue, or almost black. More than 50 distinct kinds are known, each possessing some particular merit. Of these many are foreign sorts seldom or never seen here, and varieties best suited to each climate or even to particular districts originate and are perpetuated. Some sorts, too, are prolific in flowers and seed balls, while others are nearly or entirely deficient in them; and the stems and leaves of some are ranker, coarser, larger, and of a deeper green than those of others. It has been proved that such as ordinarily seldom produce blossoms can be made to do so by robbing the growing plant of some of its tubers. In the United States many aluable sorts have gone out of general use or een superseded by others. The long red, Chenango, blue nose, state of Maine, Jackson white, strawberry, peach blow, and Davis's seedling are esteemed, and may be cited as examples or specimen sorts.—The potato boiled is considered an excellent food for swine, and the English use it in a parboiled state for cattle; boiled and mixed with meal, it can be fed to fowls. The tubers are extensively used for making starch in domestic economy, and by distillation they produce spirits. The farina or starch of the potato is often fraudulently sold for arrowroot, but the microscope readily detects the imposture. An extract of the leaves is a powerful narcotic, ranking between belladonna and conium, and particularly serviceable in chronic rheumatism and painful affections of the stomach and uterus.—The potato is subject to diseases which seriously affect its value as a crop. In Europe, the foliage sometimes presents the appearance of a rough and uneven surface, supposed to be due to a preternatural inspissated condition of the juices in the firm and mealy tuber used in planting. This injury to the leaves is called the curl, and is attributed by Mr. Andrew Knight to the state of the sap, which could not circulate freely within the growing foliage. He experimented upon some sprouts which he carefully detached from the tubers of diseased and curled plants, and found that on being planted they depended for growth entirely on the soil and its water, instead of drawing nutriment from the tuber; by this means no curl appeared, while more than nine tenths of the plants raised from the same diseased tubers proved very much infected. From this it would appear that tubers used for sets when not quite ripened would be productive of a cleaner and healthier foliage. Such unripe tubers have been found the best to plant for early crops; and when the set is cut, the end of the potato which has been last produced has proved to be preferable. In some particular varieties this distinction between the ripened and unripened end is more apparent. The potato, on account of its remarkable nutritive qualities, has been made a principal article of diet, especially with the laboring classes of Ireland. Partial failures of the potato crop and consequent distress have been frequent in that country. In 1739 a severe and early frost which destroyed the tubers in the ground caused great suffering and famine, and in 1822 the rotting of the potatoes after being stored produced the same effects. In 1831 famine and pestilence succeeded the failure of the crop in the western counties, resulting from an inexplicable phenomenon to which the name of the taint was given; it reappeared in 1838. In the meanwhile the potato disease, under the various names of mildew, murrain, rot, and pestilence, was working its way all over Europe, baffling the inquiries of scientific men and of practical agriculturists alike in seeking its cause or its preventive. It first appeared distinctively in 1845, the potatoes being found rotting late in the autumn of that year; while in 1846 a single week's time was sufficient for it to destroy the entire crop, previously to which an abundant harvest was anticipated. The accounts from all parts of the country gave full proof of an impending universal famine. Relief committees, new means of industry, and liberal assistance from abroad were provided. In the United States similar losses to the agriculturists ensued, and the potato crops were seriously injured. It was soon ascertained, however, that particular varieties were most liable, and selections were accordingly made of those freest from contagion. Raising new sorts from the seed was resorted to, the older kinds being rejected. At present the variety called Jackson white is considered best suited to the market. The disease appears toward the end of August, blackening and killing the foliage and the stems of the most luxuriant crops in a few hours. Fields thus affected are left to as late a period as possible before they are dug, but frequently after storage the work of destruction goes on, until the whole is a mass of putrescence. Putrefaction having once taken place or decay been induced, the various parasitical growths ending in more or less developed fungi are to be naturally expected. Thus results and sequences have been taken for causes. According to the Rev. M. J. Berkley, at least 6 fungi have been charged with this evil, though he considers *botrytis infestans* to be the principal one. Certain it is that the potato when planted on new soils and in poor ground, or when vegetable substances are used for manuring, is usually healthy; while lands manured with the exuviæ from the barn are peculiarly liable to impart the disease. Another disease, known as dry rot, does not entirely destroy the value of the root for feeding to swine, but is equally destructive to the germs, so that no sprouts will appear.—The potato is sometimes liable to the presence of an excess of a poisonous principle known as solanine, existing in several species of *solanum*, but particularly in sprouted potatoes, such as are stored for winter use. A very small quantity of this principle will produce symptoms of poisoning, as has been proved by actual experiment. Sprouted potatoes when about to be used as food prove better if pared and soaked for some hours in cold water; and such a precaution may preclude the possibility of any poisonous result from their use.—The native country of the potato is a matter of doubt, but common report refers it to Peru. The potato now in use is said to have been carried to England by Sir Walter Raleigh from Virginia in 1586. As early as 1597 Gerarde gave a figure of the potato plant in his "Herbal," and 43 years later Parkinson published a figure of it in his "Theatre of Plants," describing with it several kinds of similar roots which were eaten, but which belong to entirely distinct genera. Pedro Cieca in his "Chronicle" (1553) says that the people of Quito eat a tuberous root which they call *papas;* and some of the same were sent from Flanders to Clusius, a distinguished botanist of that day. It seems highly probable that the potato was introduced into Europe by the Spaniards, but though thus known to botanists and others its use as an esculent was very tardily adopted. Doubtless it was a long time before amelioration from climatic influences rendered it of good size, farinaceous, and palatable.

POTATO, Sweet, the tuber of an exogenous plant belonging to the natural order *convolvulaceæ*, and called by Choisy *batatas edulis*. It differs from the convolvulus in having a 4-celled ovary, each cell containing a single seed. The native country of the sweet potato is unknown, but it probably originated in tropical America. It must have been early introduced into Europe, and naturalized in the warmer parts of Asia, where a red-rooted variety of it is extensively cultivated for food. It is also known in Spain, in the south of France, and in Italy. The sweet potato has a creeping stem, rarely twining; its leaves are variable in shape, usually angular; they are also lobed and furnished with a petiole, smooth or even slightly hairy; the flowers are 3 or 4, peduncled; the sepals 5, acuminate, mucronate, rarely subtruncate, outer ones a little shorter; corolla campanulate, of a purple color; stamens 5, enclosed; stigma capitate, 2-lobed. The genus *batatas*, according to Don, comprises 16 distinct species, mostly natives of the tropics and conspicuous for the beauty of their flowers. They require much artificial heat in cultivation, a treatment which is given to the sweet potato in some parts of Europe. Catesby, in his "Natural History of Carolina," speaks of 4 or 5 kinds with different colored roots. He says that they should be kept in winter in caves secure from the frost, a method practised now with those designed for planting; and such are likewise packed in dry sand and kept warm until the end of winter, when they are started in hot-beds, and the sprouts having grown a few inches long are carefully taken off. In this state they are sold at the seed stores under the name of slips; these, being set out, produce new plants and abundance of tubers. They delight in a tolerably rich, light, and sandy soil, no extra care being needed except keeping the plants clear of weeds and drawing the soil up around them as they grow. In the southern United States the cultivation is extensive; in New Jersey and the western states the produce is remarkably good; and even in the neighborhood of Boston, Mass., hundreds of bushels are annually raised on the light sandy soil, the yield per acre being little inferior to that of the common potato. In all hot countries the tubers are largely consumed as food, either boiled or roasted. The *batatas littoralis* of Choisy grows wild in the drifting sands of the sea coast from South Carolina to Florida. Its leaves are 1 to 2 inches long, oval or oblong, cordate, notched at the apex, entire or hastate-lobed, the lateral lobes entire or 2-cleft, the flowers white and large. The *batatas macrorhiza* or *jalapa* (Lindley) has a very large root, and is found in similar situations; it is sometimes eaten by the negroes, being found farinaceous and saccharine.

POTATO FLY. See Cantharides.

POTATO WORM. See Hawk Moth.

POTAWATAMIE, a S. W. co. of Iowa, separated from Nebraska by the Missouri river, and drained by the Boyer and West Fork of Nishnabatona river, beside several large creeks; area, 960 sq. m.; pop. in 1860, 4,962. Its soil, which is diversified by prairie and forest, is generally fertile. The productions in 1859 were 16,561 bushels of wheat, 238,585 of Indian corn, 9,834 of oats, 26,954 of potatoes, 4,306 tons of hay, and 40,463 lbs. of butter. Capital, Kanesville.

POTEMKIN, Grigori Alexandrovitch, prince, a Russian statesman and soldier, born near Smolensk in Sept. 1736, died between Jassy and Nikolaiev, Oct. 15, 1791. He belonged to a noble Polish family in reduced circumstances, entered the Russian army at an early age, and became an ensign in the horse guards. After the revolution of 1762 at St. Petersburg, he was appointed by the empress Catharine II. colonel and gentleman of the bedchamber, and admitted to her private circle. Having served for a while under Romanzoff against the Turks, he was sent from the army to present the empress with the keys of the city of Bender, and was bold enough to make in her presence an avowal of passionate admiration which was not unfavorably received. He superseded Gregory Orloff in the good graces of Catharine, and for years had entire control over the heart and the councils of his imperial mistress. He favored the policy which brought about the first partition of Poland, but turned his attention principally to the East; and under his influence the Russians pushed their conquests toward the Black sea with the ultimate view of reaching Constantinople. As early as 1774, by the treaty of Kootchook-Kainarji, they were possessed of Azov, Yenikale, Kertch, and the banks of the lower Dnieper, while they had destroyed Turkish influence in the Crimea. By Potemkin's advice, the foundations of Cherson were laid in 1778, and the new city soon became the chief emporium of south Russia. In less than 5 years he took possession of the Crimea and the Kooban region, to which their ancient names of Tauris or Taurida and Caucasus were restored; and as a reward for his services, he received from his sovereign the governorship of the new provinces, the surname of Tauridian (Tavridtcheskoi), and the magnificent Taurida palace at St. Petersburg, built expressly for him. He now prevailed upon the czars of Georgia and Imeretia to do homage to the empress. In 1787, having persuaded Catharine to visit his government, he accomplished wonders to impress upon her mind the importance and prosperous condition of her new acquisisions. She came surrounded by the ambassadors of all nations and followed by an army of 40,000 men. Along the road she travelled happy-looking crowds cheered her passage; beautiful villages had sprung up in the wilderness, and the country seemed to be at once populous and wealthy. All these were but scenic exhibitions prepared by the art and lavish expenditure of the governor. The journey was scarcely completed when the war broke out again between the Porte and Russia. The chief command was given to Potemkin, who had several experienced generals under his orders, and Turkey was invaded. At the head of the principal army, he took Otchakov by storm; victory followed upon victory; Bender surrendered; Bessarabia, Moldavia, and Wallachia were occupied, and the strong fortress of Ismail fell. But the Russian treasury was exhausted, and Catharine was willing to make peace with her conquered opponent. Potemkin, who thought himself fairly "on the road to Byzantium," wanted to push on the war more energetically than ever; and in the hope of bringing over the empress to his policy, he repaired to St. Petersburg. But while he was here giving a magnificent entertainment to his mistress and her court in the Taurida palace, secret orders had been despatched to his lieutenant Repnin, who hastened to win a new victory over the Turks, and to grant them an armistice preliminary to the conclusion of peace. On hearing of it, Potemkin in a rage started for the south, overwhelmed his lieutenant with reproaches and insults, and swore that "he would undo all that the other had done." He was now at Jassy, where plenipotentiaries had met to negotiate. For some unknown reason he left that city for Nikolaiev while suffering under an epidemic distemper; on the journey he was seized with a violent colic, alighted from his carriage, threw himself on the grass by the roadside, and in a few minutes expired in the arms of his niece, the princess Branicka.—This remarkable man owed the commencement of his fortune to his figure and features, but afterward vindicated his claims to it by enterprises that redounded to the profit and honor of Russia. Notwithstanding his faults, his pride, avarice, intemperance, and coarseness, he was evidently gifted with a powerful intellect, or he could not so long have influenced his benefactress. She loaded him with favors of every kind; he was field marshal, commander-in-chief, and inspector-general of all the Russian forces, president of the college of war, colonel of the Preobrashenski guards, and of 3 other regiments of cuirassiers, grenadiers, and dragoons, grand admiral of the Black and Caspian seas, and governor-general of the provinces of Ekaterinoslav and Taurida. Catharine moreover bestowed upon him all the Russian orders of knighthood, and caused him to be created a prince of the German empire, and to be knighted by the kings of Prussia, Sweden, and Poland, but failed, much to his regret, to obtain for him the orders of the Holy Spirit of France and the garter of England. He owned immense estates with 5,000 serfs in Russia proper and 40,000 in Polish Russia; his income and pensions were enormous; he received 30,000 rubles for the expense of his table alone. The property he left on his death amounted to over $25,000,000.

POTHIER, Robert Joseph, a French jurist, born in Orleans, Jan. 9, 1699, died there, March 2, 1772. He was judge successively of the court of the Châtelet in his native city, and of the *présidial*, and in 1749 professor of French law in the university of Orleans. Here he used to assemble his pupils at his own house to give them supplementary lessons and talk with them more familiarly about the subject of their studies, offered prizes to encourage the most meritorious, and frequently assisted them with his purse. His great aim was to harmonize legislation with divine and natural law. His principal work is his *Pandectæ Justinianeæ in Novum Ordinem digestæ* (3 vols. fol., Paris and Chartres, 1748-'52). In it he classifies all the texts of the Digest, which were arranged with little or no method in the original work, and elucidates conflicting decisions by thorough discussions and annotations. Both in America and England the authority of Pothier is greater than that of any other foreign jurist. His treatises on "Maritime Contracts," translated by Caleb Cushing (Boston, 1821), on "Contracts of Sale," by L. S. Cushing (Boston, 1839), and on "The Law of Obligations or Contracts," by W. D. Evans (Philadelphia, 1840), are regarded as authorities on their respective subjects.

POTOCKI, a noble Polish family, whose principal seat was in the former palatinate of Cracow, and which still holds large estates especially in Galicia and the Ukraine. Since the 16th century many members of this family have attained high positions in church and state in Poland. Jan and Jakób were generals in the time of Sigismund III.; Stanislaw, surnamed Revera (born about 1589, died in 1667), was chief hetman of the crown; and Waclaw (born in 1609) was a poet and translator of the *Argenis* of Barclay. Of the later members of the family the following are most distinguished. I. Stanislaw Felix, field marshal of the Polish artillery, born in 1750, died in 1805. He published with Rzewuski and Branicki, in 1792, the famous manifesto of Targovitza, and was active in promoting the objects of the confederation of that name with the aid of the empress Catharine II. in 1793; but after the uprising of Poland under Kosciuszko in 1794, he took refuge in the United States, and was condemned to death as a traitor to his country. The victories of Suwaroff restored him to his native land, and Catharine made him field marshal. He passed the rest of his life principally on his estates in the Ukraine, tortured by remorse for his political acts so disastrous to his country. II. IGNACY, grand marshal of Lithuania, cousin of the preceding, born in 1751, died Aug. 30, 1809. He was one of the framers of the constitution of May 3, 1791, and, when the invasion of the Russians took place, was obliged to flee to Prussia. The success of Kosciuszko called him back to Warsaw, where he became a member of the new government, but was captured by Suwaroff and conveyed as a state prisoner to Schlüsselburg. In 1796 he received his freedom from Paul, and went to Galicia, where he lived in retirement until the approach of Napoleon in 1806, when he was imprisoned a second time, but was released after a detention of a few months. III. STANISLAW KOSTKA, brother of the preceding, born in 1757, died Sept. 14, 1821. He was a man of ardent patriotism, was one of those who aided in framing the constitution of May 3, 1791, and after the second partition of Poland was arrested by order of the Austrian government. After an imprisonment of several months he was set at liberty, and from this time devoted himself to the study of the arts, sciences, and literature. At the organization of the duchy of Warsaw in 1807, he returned to his native land, became associated in the ministry, and in 1815 was made minister of public instruction. On account of his great talents as an orator he was called *princeps eloquentiæ*. He wrote several works, of which the most noticeable are his treatise "On Eloquence and Style" (4 vols., Warsaw, 1815), and an excellent although unfinished disquisition on the "Art of the Ancients" (3 vols., Warsaw, 1815), founded on the work of Winckelmann. IV. JAN, a historian, born in 1761, died by his own hand in 1815. He devoted himself to Slavic history, and for this purpose studied the various Slavic languages and travelled through the countries inhabited by that family of nations. His chief works are: "Travels in Turkey and Egypt in 1784" (Warsaw, 1788); "Essay on Universal History and Investigations in regard to Sarmatia" (5 vols., Warsaw, 1786); "Chronicles, Memoirs, and Researches for the Preservation of the History of all the Slavic Nations" (Warsaw, 1793); "Travels in Lower Saxony" (Hamburg, 1795); "Historical and Geographical Fragments in regard to Scythia, Sarmatia, and the Slavi" (4 vols., Brunswick, 1796); and "Early History of the Russian People" (St. Petersburg, 1802). These works were all written in French, and are especially important for the materials collected. Only 100 copies of each were printed. V. KLAUDYNA, Countess Dzialynska, wife of Count Bernard Potocki, born in Kurnik near Posen in 1802, died in Geneva, June 8, 1836. She hastened to Warsaw when the Polish revolution of 1830 broke out, and devoted herself to the care of the sick and the wounded with an earnestness and heroism which attracted universal admiration. She subsequently went into exile, and after her death her countrymen raised a monument to her memory in Geneva.

POTOMAC, a large river of the United States, constituting nearly the whole boundary between Maryland and Virginia, and formed by the junction of the North and South branches on the N. border of the latter state. The North branch rises in the Alleghanies in the north of Virginia, and the South branch in the Shenandoah range near the centre of the state. From the junction, which is about 20 m. S. E. from Cumberland, its course forms an irregular curve first N. E. and then generally S. E., until it reaches the city of Washington. Thence flowing S. and S. W., it expands into an estuary from 6 to 8 m. broad, and after a course of about 50 m. again changes to the S. E. for about 70 m. and enters Chesapeake bay 75 m. from the Atlantic, the entire length being nearly 400 m. Its principal tributary is the Shenandoah, which enters it just W. of the Blue ridge. Several other streams, but none of considerable size, also contribute to its volume. Of these the principal are the Savage and Monocacy rivers, and the Conegocheague, Patterson, Aquia, and Opichon creeks, all of which are navigable for short distances. The tide extends to Georgetown, 120 m. from its mouth, and it is navigable for ships of the line to the city of Washington. From its source to tide water the river has a great descent. There are a number of falls, including Houre's, the Shenandoah, Seneca, Great, and Little; and from Westport to Washington, about 220 m., the difference in its altitude is 1,160 feet. It abounds in beautiful scenery, and its passage through the Blue ridge at the junction of the Shenandoah at Harper's Ferry is renowned as, in the language of Jefferson, one of the most stupendous scenes in nature. The navigation of this river was an early object of attention, and by the operations of the Potomac company, incorporated by Maryland and Virginia in 1784, many improvements were effected.

POTOSI, a town of Grant co., Wis., on Grant river, about 2 m. from its entrance into the Mississippi, 80 m. S. W. from Madison, and 15 m. N. from Dubuque; pop. in 1860, 2,729. It is situated in a deep and narrow valley in the midst of lead mines, the products of which furnish the principal trade of the town. It is divided into 5 villages, Potosi proper, Van Buren, Rockville, British Hollow, and Vernon Settlement.

POTOSI, a department of Bolivia, bounded N. by Oruro and Chuquisaca, E. by Chuquisaca and Tarija, S. by the Argentine confederation, and W. by Atacama and Peru; area, 65,500 sq. m.; pop. in 1858, 281,229. The surface is an elevated table land, mostly rugged and mountainous, being traversed by numerous abrupt ridges, which increase in height toward the Cerro de Potosi. This mountain rises to the height of 16,037 feet above the sea, and is of conical form. The Cerro de Porco is situated at a little distance to the S. W. of it, and both are celebrated for mineral wealth. The country is generally of volcanic formation, but the

Cerro de Potosi is composed of quartzose rock. More than 5,000 mines have been opened in the summit in search of silver ore, and the top has been completely honey-combed and exhausted and the miners forced to carry on their operations lower down, where the great quantity of water has compelled them to abandon many of the richest veins. The country is barren and sterile, and the chief production is the silver obtained from the mines. Between 1556 and 1800 the mines of Potosi yielded $924,944,820.—POTOSI, the capital, is situated on the N. slope of the mountain of the same name, about 13,600 feet above the sea, in lat. 19° 35′ S., long. 65° 24′ W.; pop. in 1858, 22,850. The surrounding country is bleak and barren, and the atmosphere, except where tempered by the sun's rays, cold and piercing. It is the second city of Bolivia, and at one time covered a large extent of ground, and contained 150,000 inhabitants. The greater part of the town is in ruins, but the central square, which contains the government house, public offices, a church and convent, is still in tolerable repair. The mint is a very large edifice, and contains the machinery which in former times did a vast amount of work, but the present establishment only coins $2,000,000 annually. There are numerous churches, a college which accommodates 200 pupils, 4 primary schools, and a few others for the use of the children of the miners. The plaza of Ayacucho was constructed in honor of the battle which decided the independence of South America, and contains a lofty cylindrical shaft surmounted by a statue of Liberty. The town is supplied with water from 37 tanks, 8 or 10 m. distant, which were constructed at great expense about 200 years ago. All supplies have to be brought from a distance, as the country in the immediate neighborhood produces nothing, and considerable quantities of various English and French manufactures are consumed there.

POTOSI, in Mexico. See SAN LUIS DE POTOSI.

POTSDAM, a township and village of St. Lawrence co., N. Y., on Racket river; pop. in 1860, 7,262; of the village, 2,422. It is principally noted for its extensive quarries of sandstone used for flagging and building, much of which is sent to Hamilton, C. W. Abundant water power is supplied by the Racket river, and several manufactories are in operation. The Potsdam and Watertown railroad and its connections afford communication with all parts of the state as well as with the East and West. The township contains a bank, a printing office, and 10 churches, viz.: 1 Baptist, 1 Catholic Apostolic, 1 Episcopal, 3 Methodist, 2 Presbyterian, 1 Roman Catholic, and 1 Universalist.

POTSDAM, a town of Prussia, situated on the Havel, which here forms a small lake, 17 m. S. W. from Berlin; pop. in 1849, 39,964. It contains a royal palace begun in 1660. The apartments occupied by Frederic the Great are preserved in the same state in which they were left by him. Sans Souci, the favorite residence of the same monarch, lies near the town. It is a long low building erected in 1745–'7. It contains the apartments occupied by the king and Voltaire, as well as Frederic's clock, which was stopped at the instant of his death. Another palace in the same grounds was built after the 7 years' war; and at no great distance is the beautiful villa of Charlottenhof, built in the Italian style. Other royal residences in the neighborhood of Potsdam are the marble palace, and the villa on Peacock island in the Havel. Potsdam is connected by railway with Magdeburg and Berlin. It occupies a beautiful position, and has the advantage of every possible variety of scenery in its neighborhood. The manufactures include cotton, lace, silk, linen, woollen, leather, porcelain, chemical substances, and firearms.

POTTER, a N. co. of Penn., bordering on N. Y.; area, about 1,100 sq. m.; pop. in 1860, 11,467. It has an elevated and mountainous surface, and is drained by the head waters of the Allegheny and the Genesee, and by several branches of the Susquehanna, as well as by a number of creeks. Much of it is covered by pine forests, and lumber is largely exported. The productions in 1850 were 13,359 bushels of wheat, 16,562 of Indian corn, 80,814 of oats, 8,717 tons of hay, 134,887 lbs. of maple sugar, 22,046 of wool, and 168,677 of butter. There were 8 grist mills, 50 saw mills, and 1,026 pupils attending public schools. Capital, Coudersport.

POTTER. I. ALONZO, D.D., LL.D., an American clergyman, bishop of the Protestant Episcopal church in Pennsylvania, born in Beekman (now La Grange), Dutchess co., N. Y., July 10, 1800. He was graduated at Union college, N. Y., in 1818, became a tutor in the college in 1819, and was elected professor of mathematics and natural philosophy in 1821. Having studied for the church, he was ordained deacon in April, 1821, and priest in Aug. 1824. In 1825 he was elected president of Geneva (now Hobart) college, N. Y., but declined the post. He was invited to the rectorship of St. Paul's church, Boston, in 1826, where he remained till 1831, in which year he became vice-president and professor of moral philosophy in Union college. He received the degree of D.D. from Harvard and Gambier colleges, and in 1846 that of LL.D. from Union college. Having been chosen bishop of Pennsylvania, he was consecrated Sept. 23, 1845. He has published "The Principles of Science applied to the Domestic and Mechanic Arts," &c. (12mo., New York, 1841); "Political Economy, its Objects, Uses, and Principles considered" (18mo., 1841); "Handbook for Readers and Students" (18mo., 1847); "Discourses, Charges, Addresses," &c. (12mo., Philadelphia, 1858); and, in conjunction with George B. Emerson, "The School and Schoolmaster" (12mo., New York, 1844). II. HORATIO, D.D., LL.D., brother of the preceding, an American clergyman, bishop of the Protestant Episcopal church in the diocese of New York, born in Beekman, Dutchess co., N. Y., Feb. 9, 1802. His early education was obtained at the academy in Poughkeepsie, N. Y.; he was graduated at Union college in 1826, ordained deacon in July, 1827, and priest the next year. In 1828 he was appointed professor of mathematics and natural philosophy in Washington (now Trinity) college, Hartford, Conn., where he spent 5 years. While in Hartford he was invited by Bishop Moore to become his assistant in the Monumental church, Richmond, Va., but declined. In 1833 he was called to the rectorship of St. Peter's church, Albany, N. Y. In 1837 he was elected to the presidency of Trinity college, Hartford, but declined. He received the degree of D.D. from Trinity college in 1838; of LL.D. from Geneva college, N. Y., in 1856; and of D.C.L. from the university of Oxford in 1860. On the death of Bishop Wainwright in 1854, Dr. Potter was chosen provisional bishop of the diocese of New York, and consecrated Nov. 22, 1854. By the death of Bishop B. T. Onderdonk, April 30, 1861, he became bishop of the diocese.

POTTER, Hazard Arnold, M.D., an American physician and surgeon, born in Potter township, Ontario, now Yates co., N. Y., Dec. 21, 1811. He was graduated M.D. at Bowdoin college in 1835, and began the practice of his profession in Rhode Island, but after a residence there of a few months returned to his native town. In 1853 he removed to Geneva, N. Y., where he enjoys a high reputation as a surgeon and consulting physician. In 1845 he trephined the spine for depressed fracture of the arches of the 5th and 6th vertebræ, and has performed the same operation twice since. He has performed ligature of the carotid artery 5 times, 4 times successfully, removed the upper jaw 3 times and the lower twice, and successfully removed the 5th rib on the left side from the sternum to within 3 inches of the spine, for caries of the bone accompanied by abscess in the left hypochondrium. Dr. Potter was early convinced of the safety of operations within the abdominal cavity, and in 1843 performed gastrotomy for the relief of intussusception of the bowels with perfect success. He has removed fibrous tumors of the uterus from within the abdominal cavity 5 times, and successfully in 3 cases. He has extirpated by ovariotomy 8 ovarian tumors, 5 of them successfully, and in one of the successful cases both ovaries were removed at the same time. In another case, also successful, the operation was repeated upon the same patient twice with an interval of 17 months; each time the tumor and its contents weighed nearly 30 pounds. Dr. Potter was also one of the first surgeons who called attention to the presence of arterial or bright red blood in the veins of the parts paralyzed by depressed fracture of the cervical vertebræ, which he first observed in 1837. In these cases he believes that if the patient lives the ganglionic or sympathetic system, after a few weeks, assumes that function of the cerebro-spinal axis which regulates the processes of assimilation and nutrition. In a case of amputation at the hip joint reported in the "New York Journal of Medicine and Collateral Sciences" (June, 1854), he introduced a method of amputation in such cases which was at that time deemed novel. Proceeding as if for amputation at the upper third of the femur by flaps, he extended the external incision up to the trochanter major, and dissected out the head of the bone, by this method obtaining among other important advantages a large muscular stump for an artificial limb. He has repeated the same operation successfully since.

POTTER, John, D.D., an English prelate, born in Wakefield, Yorkshire, in 1674, died in 1747. He was the son of a linen draper, and was graduated at University college, Oxford, in 1692, and in 1694 was chosen fellow of Lincoln college and took orders. He was known as a scholar very early in life, his edition of Plutarch's *De Audiendis Poetis* having been published when he was only 19. His best known work, "Antiquities of Greece," was published in 1697, when he was 23 years of age. He was made D.D. in 1706, and soon after chaplain in ordinary to Queen Anne, and in 1708 was chosen regius professor of divinity and canon of Christchurch, Oxford. Seven years later he became bishop of Oxford, and in 1737 archbishop of Canterbury. His theological works were collected in 3 volumes (Oxford, 1753).

POTTER, Louis Joseph Antoine de, a leader in the Belgian revolution of 1830, born in Bruges, April 26, 1786, died there, July 22, 1859. He was born of rich and noble parents, spent his youth partly in Holland, partly in Germany, and lived from 1809 to 1811 in southern France, and the 13 following years in Italy, where he devoted himself to the study of church history. In 1824 he returned to Brussels, was one of the bitterest opponents of the king and the ministry, and for his free expression of opinion was sentenced in 1828 to 18 months' imprisonment and a fine of 1,000 florins. Considered by the people as a martyr, he was borne in triumph to his prison, and there wrote a pamphlet on "The Union of the Catholics and the Liberals." For other publications of a revolutionary character he was tried on a charge of high treason, and in April, 1830, was sentenced to 8 years' banishment. After the French revolution of July he took up his residence in Paris, and from there addressed a letter to the king of the Netherlands, advising him to constitute Belgium a separate state. Upon the breaking out of the Belgian revolution in September he returned to Brussels, where he was received in triumph and made a member of the provisional government. He favored the establishment of a republic, but was opposed by his colleagues and defeated by a large majority in the national congress. After the dissolution of the provi-cal government he was obliged to flee to France, and took no farther part in political affairs. The most important of his numerous works is his "History of Christianity" (8 vols., Paris, 1836-'7).

POTTER, Paul, a Dutch painter, born in Enkhuysen in 1625, died in Amsterdam, Jan. 15, 1654. He was instructed in his art by his father, Peter Potter, an artist of moderate ability, and as early as his 15th year had so great a reputation for his cattle pieces, that he could with difficulty supply the demands of his patrons. He excelled all contemporary artists in the painting of cows, sheep, goats, and other domestic animals, which he invariably studied from the life, making the landscape and other parts of the picture subordinate to them. Some of his best works were executed for Frederic Henry, prince of Orange, who had a high admiration of his genius. He was ardently devoted to his art, and found his chief relaxation from the labors of the studio in sketching from nature during his walks in the fields. Excessive application undermined a naturally delicate constitution, and he died at the age of 29 in the very maturity of his powers. His best pictures are of small size, exhibiting exquisite finish, a free handling, and brilliant effects of sunshine; but some are painted of the size of life. Of the latter class a notable example is the picture known as the "Young Bull," now in the museum of the Hague. Of his cabinet-sized pictures one of the finest is a landscape with cattle and figures in the possession of the marquis of Westminster. Another picture representing 4 oxen in a meadow, which sold in 1750 for £25, was bought in 1815 by the emperor of Russia for £2,500. Many similar instances of an advance in the value of his works are recorded. He executed some admirable etchings.

POTTERS' CLAY. See Clay.

POTTERY and PORCELAIN, baked earthenware, the former opaque and of coarse quality, the latter translucent and of fine quality. The name pottery is said to be derived from the low Latin *potus*, a pot, and porcelain is supposed to be from the Italian *porcellana*, a drinking cup. The manufacture is often called the ceramic art (Gr. *κέραμος*, potters' earth), and its products fictile ware (Lat. *fingo*, to form). The fashioning of various utensils in clay and baking them either in the sun or by fire has been practised from the remotest periods, and by the ancient Egyptians the art was attributed to the gods, showing that its date preceded their records. Frequent allusions are made to it in the Old Testament, and the relics found among the ruins of different eastern countries show that the manufacture was practised among nations widely separated from each other by religion, manners, and laws. Indeed it is to such fragile memorials of the past that we are indebted for much of the knowledge we have of the history, customs, and superstitions of the ancients. Upon the bricks and articles of pottery found in Egyptian, Assyrian, and Babylonian ruins are often preserved hieroglyphics (see Cuneiform Inscriptions) of no little historical interest; and upon the walls of the tombs in Egypt are pictured the various processes employed in the production of the earthenware utensils. These, though rudely conducted, were similar in principle to the methods now in use—the potters' wheel, which is also alluded to in the Old Testament, being represented, as well as a furnace in which the articles were baked. These articles were of great variety, some being intended for domestic, some for religious, and some for funereal purposes. Those of each nation possess a distinctive character, while a general resemblance is perceived in their quality and uses. Among the Egyptians vases or jars appear to have been the prevailing utensils for a great variety of purposes, and in eastern countries they are still employed in the place of numerous wooden and metallic vessels and baskets of more advanced nations. These were of all sizes, from several feet in height down to scarcely an inch, and variously shaped to suit the purposes required. Some were water jars with wide necks, and some with contracted throats furnished with spouts. Wine, oil, honey, milk, drugs, ointments, grain, and numerous other articles had their peculiar-shaped vases or jars, and the several tradesmen and artificers employed vessels specially adapted to their uses. Thus, to this ancient people earthenware was obviously of far greater importance than it is to us. Many articles were largely manufactured and esteemed by them of great value, which have long since ceased to be used. Such are those employed in their funereal and religious rites; vases for the mummies of the sacred ibis and other animals, and others for containing the portions of the human bodies removed in the process of embalming; models of mummy cases kept by undertakers to show to the friends of the deceased, as described by Herodotus; *shabti* or sepulchral mummy-like figures to be deposited with the deceased in the tomb; and singular conical-shaped sepulchral ornaments, upon which, as upon the *shabti*, were inscribed various legends relating to the dead, or of more general interest. The tombs were the receptacles of a multitude of articles supposed to have been deposited for the use of the deceased in the future life. All these were made in terra cotta or unglazed common ware, and the color was red; their date goes back as far as the 3d and 4th dynasties, or from 2,000 to 3,000 years B. C. Some of the finer articles appear to have been polished by some mechanical process. Glazed ware was in use in the 6th dynasty; the glaze appears to have been formed of pulverized silex and soda and colored by various metallic oxides; the blue tint discovered and used at this early period retains its lustre to the present time, and is unsurpassed by the productions of modern art. Beside these were numerous articles worn for ornament, as beads, amulets, &c., which from the numbers preserved must have been manufactured in wonderful profusion. The specimens of Assyrian pottery that have been preserved are for the most part bricks and inscribed tiles, cylinders, and prisms. These were used as tablets for preserving the records of the Assyrian kings, and in their reigns constituted with other similar documents the libraries and the archives of the monarchs. Glazing and enamelling the surface of bricks, tiles, and other articles of earthenware, were practised by the Assyrians, but not with the skill of the Egyptians. The Babylonian relics of this class are similar to those of Assyria. Bass-reliefs in terra cotta appear to have been more common, and generally produced in moulds; they represent figures of men and animals, and some of great interest for the artistic execution have been modelled by hand. Large images were made in clay and covered with brass or bronze; to such allusion is made in the book of Daniel. The golden idols were probably formed of clay upon the potters' wheel and overlaid with gold. Coatings of this metal and of silver were applied not only to such objects, but to the bricks intended for the principal edifices.—In Europe the most ancient pottery worthy of notice was that of the Etruscans. As far back as the 7th and 8th centuries B. C. their vases, of a coarse dark brown ware, in great variety of sizes, adorned with figures in relief, were fabricated in forms of such perfection and beauty as to entitle them to the rank of works of art. In the productions from the 5th century B. C. the effect of intercourse with the Greeks is perceived in the change from the native style to imitations of the Hellenic. The Etruscan relics of this class are chiefly vases of black, brown, red, and yellow terra cotta; and they owe their preservation to the same custom as that of the eastern nations of that period of interring these articles in the sepulchres with the remains of the dead. The sarcophagi themselves were constructed of slabs of pottery, and two of them preserved in the British museum are elaborately ornamented on the sides and ends with bass-reliefs, and on the covers with full-length effigies of Etruscan females. A vase, also in the museum, is a model of an ancient Etruscan cottage, with a movable door and a vaulted roof imitating the wooden rafters. This probably contained the ashes of some distinguished person, and being placed in another large two-handled vase, the whole was buried in the earth.—The pottery manufacture was quite as important in Greece from the 5th to the 3d century B. C. as in any of the other countries named; and it included even a greater variety of articles which were finished in higher styles of art. At Athens and other cities of Greece there were at times exhibitions of these productions, by which a spirit of competition was incited. Most of the relics now preserved are those that were deposited in the tombs, chiefly vases; among other articles small terra cotta figures, resembling modern plaster casts, have been found near the sites of some of the cities in great abundance. These and the architectural ornaments were painted in appropriate colors by artists specially devoted to this object. Lamps of a fine paste and delicate construction and bearing inscriptions are found, and those that may be referred to the period of the Roman dominion are very numerous. Vases, called *amphoræ*, usually of cylindrical or egg shape, were universally employed for the storing and transportation of oil and of other commodities, as also for different domestic purposes; and upon their handles were stamped trade marks and other devices. Ornamental vases also of remarkably graceful forms are very numerous, imitating the figures of animals, heads of Bacchantes, &c., also highly decorated with figures in relief, and with elaborate coloring. In many of them the colors are protected and their brilliancy increased by a transparent glaze, composed of an alkali, silex, alumina, oxide of iron, and lime, in proportions not unlike those found in volcanic ashes, thus suggesting that these may have been spread over the surface and fused. The ceramic art declined in Greece from the 3d century B. C. The introduction by Alexander the Great of vases made of the precious metals led to their substitution for the better varieties of fictile vases. Those of metal soon became common in Sparta; in the 1st century B. C. they had entirely superseded those of earthenware, so that in the time of Augustus the latter were antique curiosities. The finest specimens of Greek vases, among which are many elaborately ornamented with pictorial devices representing scenes of historical or mythological character, are found in Etruria, and were the work of Grecian artists removed thither, or of Etruscan artists educated in Greece. Some of similar character are also found in central and southern Italy. Beautiful examples of these are preserved in the British museum and in the museum of practical geology in London.—Pottery was applied by the ancient Romans to the construction of statues and architectural ornaments; and when marble and bronze were at later periods substituted for it by sculptors, the models were still made in terra cotta. A great variety of articles for domestic purposes made of this material are enumerated by Birch in his "History of Ancient Pottery" (London, 1858). Vases, as with the eastern nations, were still the most numerous and useful products of this art. In general they were made with less regard to beauty of form and ornament than to the purposes for which they were designed; and they are consequently far inferior to the Grecian manufacture of the same period. The finest ware is that known as the Samian or Aretine, of the potteries of Samos and Aretium, now Arezzo, in Tuscany. The latter was produced from the 1st to the 3d century A. D., and was widely scattered throughout the colonies established by the Romans. Even in Britain relics of it have been found in considerable quantity at the stations occupied by the Roers. The ware is remarkable for the rich d color of its paste like that of sealing wax, nd for the thorough and admirable manner in hich it must have been worked. The color oth of the paste and glaze was derived from xide of iron. The articles are thin and deli- ate, and wherever found are remarkably alike form, structure, and style of ornamentation. hey were evidently highly valued, as frag- ents have been found neatly riveted together ith lead. Bowls were the most beautiful and laborated of these articles, and upon their ex- ernal surface are seen arabesques and pictorial llustrations of the religious habits and customs f the people. These are sometimes moulded n relief, and sometimes impressed in intaglio rom a stamp of the figure in relief. Such tamps have been found together with the odelling tools, styles, punches, and other arti- les employed.—Little is known of the early ottery manufacture of the East. The Chinese scribe its invention to the emperor Hoang-ti, 2700 B. C., and the first production of porce- ain they fix in the Han dynasty, about 185 B. C. Common pottery is manufactured to an mmense extent for the requirements of the mbler classes, and earthenware vessels of ery large size are employed by wealthy Chi- ese as reservoirs for gold fish and aquatic lants, and for storing grain, &c.; but porce- ain has extensively supplanted it as an article f export. Porcelain is used not merely for do- mestic utensils, but also for slabs and tiles, with which costly edifices are coated. Such was the famous pagoda of Nankin, destroyed in 1856. Marco Polo, in the latter part of the 13th century, was struck with the extent of the porcelain manufacture in China, and the extraordinary cheapness of the ware, 8 cups of which could be purchased for a Venetian groat. The finest articles were not exported, and great care was taken to prevent strangers from learning the processes of manufacture. The French Jesuit D'Entrecolles was the first person permitted to witness these, and from what he saw and learned from Chinese books on the subject he was enabled to send to France in 1712, from a seat of the manufacture at Jao-tcheou, such an account of the operations that, aided by the specimens of the two most important materials, also sent, Réaumur succeeded in learning the true character of the ware and how it might be made in France when suitable materials should be discovered. Such ware was afterward produced in the Sèvres porcelain. The historical facts above cited relative to the manufacture of porcelain in China are from the work of M. Stanislas Julien, an eminent Chinese scholar, who published in 1856 in Paris a translation of a Chinese work on the history of the porcelain of King-te-chin, to which he added an elaborate preface and notes from other sources. From this account it appears that there are at least 50 establishments devoted to the manufacture; and at the great works of King-te-chin, which for more than 5 centuries have enjoyed the special patronage of the emperors, 3,000 furnaces are now in constant operation. Among the choicest productions are the vases known as "crackle," the glazing of which is covered with a network of fine cracks produced by sudden chilling at a certain stage of the baking. Being then washed over with a colored glaze, which is sometimes ruby red, the cracks are filled with it, producing a beautiful effect. In another variety the color is brought out only when the vessel is filled with a liquid. This is effected by painting the design on the inner surface of a very thin cup, and washing over this more of the paste, so that the figures are enclosed between two surfaces. The outer surface after the baking is ground nearly to the colored figures and is then glazed. The liquid acts as a foil to bring the design into view. In another the design is plainly visible upon a perfectly smooth surface of pure white; an effect produced by impressing the design from a mould in relief and then restoring the smoothness by a thick glaze of fine consistence. The egg-shell ware is very ancient and celebrated. Cups, jars, vases, &c., are made of this, so thin and delicate as to be almost transparent. At one time in the 15th century it was produced as thin as bamboo paper. It is sometimes pure white, sometimes of cream color, and again of an exquisite shade of blue derived from cobalt. The chief domestic sources of this color were exhausted in 1500, and since that time the Chinese have procured their best cobalt from Europe, principally from England. The porcelain manufacture of Japan is of similar excellence to that of China, and is supposed to be nearly as ancient.—Upon the American continent the manufacture of pottery is also traced back to remote periods, and the productions of some of the South and Central American aborigines and of the "mound builders" of the West are particularly interesting. The works of the ancient Peruvians that still exist testify to a high degree of skill as attained by their potters, and the varied uses which the articles in pottery served. Drinking vessels and flasks appear to have been the most common productions, and the latter were frequently provided with two necks, a characteristic of such vessels among both the ancient and modern potters of South America. The paste is usually red or yellow, and ornamented with figures in black, red, white, and yellow. Many of the flasks are beautifully formed with long delicate necks, and others are heads of animals, as the jaguar. Others have the forms of birds and of some of the native fruits. In rare cases the human face is seen in relief on their surface, and some are true vase busts. A figure of a drinking vessel given by Ewbank in his "Life in Brazil," about 9 inches in height, is a head of the celebrated cacique Ruminhauy, and probably correctly represents his appearance, as it introduces particular marks, such as the loss of a tooth and a wound in the cheek, The pottery now made by the Peruvian Indians is far inferior in quality and form to that of ancient times. Some peculiar forms common to the ancient wares Ewbank esteems worthy of imitation, such as the double-necked "monkey" or jug common in Brazil, one small neck being designed for admitting air, while the liquid is poured out from the larger one. He states that the production of crockery in Brazil is enormous, and that cargoes of boats are frequently seen almost entirely composed of the *talhas* or large water vessels. These are made of a light red porous clay, are unglazed, and hold from 10 to 15 gallons each. The wares of Bahia are much superior to those of Rio. The ruins of Central America have furnished earthen vessels well baked, ornamented with different colors, and covered with a vitreous glaze such as was unknown in Europe for many centuries after their probable date. The Mexicans also had early attained a high degree of perfection in their pottery. That of the Cholulans, according to Herrera, was extremely delicate, rivalling in beauty the Florentine manufacture; and that of the Tlascalans was unsurpassed in its excellent qualities by any in Europe. About the ruins of New Mexico and Chihuahua relics of these ancient wares are found in the greatest abundance. For miles around certain ruins in the country of the Pimos Indians the surface is found strewn with broken pottery of fine quality. The colors are red, black, and white, and many of the articles are painted on the inside, while modern Indian and Mexican wares are painted on the outside. Among the relics found in the western mounds by Messrs. Squier and Davis, and described in the 1st volume of the Smithsonian "Contributions to Knowledge," are very curious and interesting specimens of pottery. Some of these were earthenware pipe bowls moulded in clay in the form of various animals and birds, some of which are not found nearer than the gulf of Mexico; others were of the form of the human head and very skilfully executed; but the best pipes were mostly carved in stone. The vases from the mounds were well executed, thin, and handsomely ornamented. Some of the finest from Ohio are dark brown and highly polished; those from the southern mounds are coarser. Most of them appear to have been merely hardened over a fire, not burned in a kiln. In his account of the "Aboriginal Monuments of New York" ("Smithsonian Contributions to Knowledge," vol. ii.) Mr. Squier remarks upon the great profusion of fragments found upon the site of every Indian town in that state and the rarity of entire vessels. The shape of the articles was like that of a gourd, the bottoms rounded, rarely flat, and protuberances or a groove around the vessel were supposed to be made to facilitate their being suspended by a cord. The capacity of the vessels was from one to four quarts, but some of them were much larger. They were generally very plain, though some were elaborately finished if not tastefully ornamented with dots and lines, evidently made with a pointed stick or bone in the material when soft.—Few among the most savage nations are so low in intelligence as not to have manifested more or less skill in the manufacture of pottery wares of some sort. Some have not attained the art of baking their productions in the fire, but merely dry them in the sun. Pickering states that the Feejeeans produce articles of large size and of uniform shape and dimensions, and glaze them with the resin of a tree.—After the decline of the Roman empire pottery as a decorative art was lost in Europe. The Arabs introduced it into Spain on their conquest of that country in the early part of the 8th century, and also into Sicily in the next century. Their productions were for the most part tiles for pavements and for the decoration of the walls of buildings, a branch of the art in which they excelled, giving to the slabs a yellowish white enamel of high lustre, and ornamenting them with elaborate designs in gorgeous colors, yet harmoniously blended, representing, with scrolls, arabesques, and inscriptions of oriental origin, figures of birds and other animals of the country, and occasionally the local coat of arms. With such tiles they adorned the Alhambra, and in Sicily the great mosque at Palermo. Into Italy also the manufacture gradually spread, and by the 14th century the art was there improved as well by native inventions as by the introduction of Grecian processes from Byzantium. In Pesaro at this period was practised what may be regarded as the basis of the celebrated Majolica ware, the overlaying of an opaque white surface upon the common pottery groundwork. This foundation being partially baked, it was covered by immersion with a thin coating of a pure white clay, with which were intermixed oxides of lead and tin. The baking was then completed in the kiln. This style was greatly perfected by the skill and genius of the Robbias, uncle and nephew, of Florence. For two centuries the finest works in pottery in Europe were of Majolica ware, characterized by its peculiar lustrous enamel, and named it is supposed from the island of Majorca, where similar work had been produced by the Moors. The greatest variety of utensils were made of it, and in their ornamentation were employed the designs of the most distinguished artists. To such extent was this carried that the articles came to be prized only for their decorations, and their utility was lost sight of. Urbino, Gubbio, Castel-Durante, and Faenza were places especially famous for this ware, and the term *fayence* by which also it is designated was probably derived from the last named city. In the 16th century this class of pottery manufacture was introduced into Nuremberg in Germany and Nevers in France, and was also practised with great success at Saintes by Palissy "the Potter," whose colored enamels were produced upon a tin glaze. But in both France and Germany other styles of enamelled pottery had been manufactured for some centuries previously. The Dutch have been famous from the 15th century for their glazed colored tiles and other pottery produced at Delft and its vicinity. From that period they continued to be largely introduced into England for churches and expensive mansions; and in the 16th century their dishes for dinner service were well known throughout Europe. The Dutch in their ornamental designs appear to have copied the old porcelain of Japan, with which they were early acquainted.—Chinese porcelain was imported into Europe by the Portuguese in the early part of the 16th century, and was known as china. The Dutch and English afterward brought the ware from the East, and as it became known every attempt was made to ascertain the secret of its beautiful translucency and to produce the same ware in European countries. Böttcher, an apothecary's assistant at Berlin, a refugee in Saxony on account of his reputation as an alchemist, first discovered the nature of the material, and succeeded in producing in 1709 a genuine white porcelain of natural clays without metallic fluxes. The elector Frederic Augustus was so much pleased with it, that he established a manufactory at Meissen of which Böttcher was made director. In this good porcelain was produced in 1715 from the kaolin of Aue in the Erzgebirge. Such was the origin of the porcelain works of Dresden, from which the art extended to Vienna and Berlin, where were founded in 1720 and 1751, respectively, the works in which the famous wares of those places have since been produced. The experiments of Réaumur, already referred to, resulted in the invention of a compound of earths and fluxes, which when partially melted in the fire formed a material resembling porcelain, and known as soft porcelain. Works for manufacturing the ware were established in 1735 at Chantilly, and 10 years later at Vincennes. In 1756 by royal sanction the works were removed to Sèvres, where after 1769 they were supplied with true kaolin (see CLAY), and also with the feldspar or petunse which had been discovered with it near Limoges. Porcelain was made in England in the middle of the last century, first at Chelsea under the patronage of George II. and the duke of Cumberland, also at Stratford le Bow, Derby, Plymouth, Worcester, and other places. The works at Worcester, patronized by George III., have been styled since 1788 the royal porcelain works. They have continued in operation to the present time, and their productions have been famous for their beautiful translucency and the rich variety of their colored and gilded decorations. Staffordshire is also an important seat of the porcelain manufacture. There also are the most extensive potteries in England, established upon the same spots that were occupied for similar purposes by the potters of the period of the Roman occupation. In 1650 Burslem in this district was noted for its various fictile productions, and Newcastle-under-Lyme for its manufacture of tobacco pipes. Salt glazing was discovered here in 1680. In 1730 Josiah Wedgwood was born at Burslem, and 30 years afterward he had produced specimens of the peculiar cream-colored ware, which by permission of Queen Charlotte he was allowed to designate "queen's ware," and which soon came to be applied to a great variety of articles. (See BISCUIT, and WEDGWOOD.) By means of his chemical acquirements and extraordinary skill he succeeded in imitating in porcelain famous cameos and antiques in precious stones, as seals, and his artificial jaspers were wonderful facsimiles of the natural mineral. His imitations of the famous Portland vase, of which he produced 50 copies, were hardly surpassed in beauty by the original itself. In 1852 the Staffordshire potteries comprised 133 establishments, which gave employment to more than 60,000 persons. All branches of the art are there carried on, including the production in the ancient style of inlaid tiles and moulded architectural terra cotta. The "statuary Parian" or "Carrara biscuit" ware, for statuettes and other objects, was invented there in 1845. In these potteries were consumed in 1855 about 750,000 tons of coal; the value of the gold used for the ornamentation of the articles was about $250,000. In 1859 the manufactured ware sent out of the district amounted to over 110,000 tons, which, at the average value of £25 per ton, was worth £2,500,000. A very large proportion of the exports are to the United States.—In the United States, such is the cheapness and the excellence of the imported pottery, the manufacture has made little progress, notwithstanding good materials for different sorts of ware are sufficiently abundant. Small establishments for the production of the commoner sorts of earthenware have long been in operation in nearly all the states, and some have engaged in the manufacture of stone or white ware. At the Jersey City potteries porcelain was made in 1816, and again at an establishment in Philadelphia, which closed in 1836; and at a pottery at Liverpool, Ohio, a small amount of the "Parian" ware has been produced. The Jersey City works are now engaged in the manufacture of the cream-colored or "CC" ware, the clays for which are obtained from the region of upper secondary rocks about Amboy. In New York city and Brooklyn several potteries are in operation. Two at Greenpoint, Brooklyn, produce porcelain of fair quality. The New York city potteries in 18th street are largely engaged in the manufacture of the common cream-colored, dipped, and white granite wares, employing about 100 workmen and producing about $75,000 worth per annum. The blue clay used at these works is from Woodbridge, N. J.; china clay from England and Delaware, and some from South Carolina; and the feldspar is from Middletown, Conn. The common salt-glazed and red wares are made in several other potteries in the city. The other most important potteries in the United States are at Trenton and Perth Amboy, N. J., East Liverpool and Zanesville, Ohio, and East Peoria, Ill. At Bennington, Vt., there was also a large establishment, recently stopped. Coarse pottery in large quantities has been for some time manufactured at Hamburg, S. C. The imports of pottery of all kinds into the United States during the year ending June 30, 1859, amounted to $3,485,032, of which $2,555,770 was from England and $599,080 from France.—The following table presents the order of the introduction of the several sorts of pottery in different countries:

B. C.
2600—Pottery in China.
2122—Bricks with true glaze at Babylon.
1900 to 1800—Egyptian pottery.
1500—Coræbus, inventor of pottery.
1200—Invention of potter's wheel by Talus (very doubtful).
900—The Samian potters.
715—College of potters instituted by Numa.
500—Etruscan vases.
434 to 284—Græco-Etruscan vases.
Before the Christian era, but of uncertain date, are the Gaulish, Celtic, Breton, German, and Scandinavian pottery.
Very ancient, possibly before the Christian era, is the hard Mexican pottery, with hard silico-alkaline glaze.
A. D.
150—Roman pottery with red glaze.
1st to 3d century—Dull Gallo-Roman pottery.
711 to 780—Varnished Arab pottery.
1100—Lead glaze.
1146—Enamelled fayence.
1300—Lead and tin glaze.
1415—Luca della Robbia enamelled fayence.
1511 to 1540—Majolica of Orazio and Flaminio Fontana.
1540—Flemish stoneware.
1555 to 1600—Bernard Palissy enamelled fayence and Delft ware.
1695—French tender porcelain, first manufacture tolerably fine.
1706—Böttcher made porcelain in Saxony, whence the art spread all over Germany from 1710 to 1760.
1725—English fine earthenware with flint.
1741—French tender porcelain, second manufacture, very fine.
1745—English tender porcelain.
1763—Wedgwood, fine earthenware.
1771—Sèvres, hard porcelain.
1800—Spode brought both the paste and glaze of English tender porcelain to perfection. Phosphate of lime and boracic acid introduced.
1830—Fine earthenware brought to perfection. Introduction of kaolin into the paste, and hardening of the glaze.

—The articles included in the term pottery are of a great variety of composition as well as of figure and uses. Bricks and tiles (described in this work under their own names) are examples of the coarsest wares; and from these there is a regular gradation, commencing with the common red earthenware through the varieties of stoneware, to the different sorts of porcelain. These varieties are too numerous to be particularly designated in this article. The following general divisions may be recognized: 1. Soft pottery, including the wares of open, porous structure, composed of natural mixtures of sands and clays, or of the latter artificially tempered with sand, always colored, usually fired at a moderate temperature, and either glazed or not. The texture is usually not homogeneous. These wares are bricks, tiles, drain pipes, chimney pots, Hessian crucibles, and a great variety of ordinary red pottery. 2. Fine earthenware, composed of finer materials more carefully selected, containing no ingredient used as a flux, the mass white, hard, and sonorous, of earthy fracture, and covered with a crystal glaze containing lead or borax. Delft ware is an inferior variety, formed chiefly of potters' clay and marl. 3. Stoneware, fine and common, the former including the Wedgwood wares. They differ from fine earthenware by the use of Cornish stone as a flux, the heat employed in firing being sufficient to partly fuse it; and from porcelain by the almost entire absence of translucency. No glazing mixture is applied to them, but sometimes a glaze is otherwise produced. Common stoneware is produced at a higher temperature and by a simpler process. It is dense and vitreous enough not to require glazing, but this is sometimes done by throwing salt into the kiln, which vaporizes and forms with the silica a soda salt. It is of various natural colors, or others are imparted to it by external applications. 4. Porcelain, the hard, translucent variety, prepared of carefully selected kaolin and pulverized quartz and feldspar, and covered with a glaze of similar composition, but somewhat more fusible than the mass, with which it becomes intimately incorporated at the high temperature employed in the baking. The true hard porcelains are distinguished for their infusibility. The so called soft or tender porcelain formerly produced at Sèvres is not of the nature of pottery, but more like glass, into which it would melt at the high heat at which true porcelain is baked. It contains no clay, but is composed of fusible mixtures of silica and alkaline and earthy fluxes, covered with a lead glaze of harder consistence than the mass, but softer than true porcelain. The term soft, however, has principal reference to the readiness with which the material softens in the fire. The English tender porcelain is also a very fusible mixture, containing a large proportion of bone ash, and glazed with oxide of lead and borax. Cornish granite and kaolin, however, form its basis. The bone ash, composed of phosphate of lime, carbonate of lime, and a little magnesia, makes an excellent flux; and the phosphoric acid in baking diffuses itself through all the materials, uniting them into a translucent enamel, which has little tendency to lose its form by shrinking. This is the only kind of porcelain made in England, for the reason chiefly that suitable "seggars" for holding the articles in the kiln, and capable of withstanding the intense heat required for producing the hard porcelain, cannot be cheaply enough obtained.—The preparation of these varieties of pottery depends upon a multitude of mixtures of clays, pulverized quartz or flints, and feldspar, and sometimes of coloring materials for the mass or body, beside numerous glazes more or less complicated in their composition. The enamels and various styles of ornamentation add largely to the range of the subject; and but few of the topics embraced in it can be particularly noticed. At the Staffordhire potteries the clays and other materials are furnished from different parts of Great Britain, the fire clays coming from the coal measures in the vicinity of the works, the kaolin and Cornish stone from Cornwall, and flints and chalk from the chalk formation at Gravesend and New Haven. Common plastic clay also is obtained from different sources, and steatite or soapstone is brought to be introduced into the mixtures. For the porcelain and fine earthenwares the materials are reduced to fine powder and variously mixed to form the paste for the several varieties of these wares. The vitreous ingredients are sometimes calcined to form a frit, which is mixed with the mass. Such mixtures for the tender porcelain are as follows: bone ash 600 parts, kaolin 300, Cornish stone 360, frit 40—the last being composed of 100 parts of bone ash, 90 of sand, and 7 of pearlash. Sometimes, as in the case of table ware, all the ingredients are mixed without calcining, in the following proportions: bone ash 450, Cornish stone 200, kaolin 160, blue clay 45. Articles of such composition, after having been once fired for about 48 hours at a very high temperature, are converted into a porous biscuit, which for most purposes requires an exterior glaze to render the ware impervious to liquids. A variety of preparations are in use for this purpose, mixtures of some of the following ingredients: silex, feldspar, gypsum, carbonate of lime, borax, boracic acid, common salt, potash, soda, and oxide of lead. Colors are given by the addition of the oxides of manganese, cobalt, iron, copper, chromium, &c.; while opaque glazes or enamels are formed by introducing oxide of tin or phosphate of lime. The glaze made into a paste is applied upon the surface of the biscuit, and this is reheated at a less temperature (in England) and for a shorter period than in the first firing. The following analyses from Knapp's "Chemical Technology" represent the composition of some of the clays deprived of water and porcelains:

Clays and wares.	Silica.	Alumina.	Protoxide of iron.	Lime.	Magnesia.	Phosphate of lime and protoxide of iron.	Alkali and loss.	Specific gravity.
Cornish china clay	53.16	45.61	0.31	0.41	0.51	..	..	..
" "	53.12	46.00	0.31	0.57	0.51	..	..	..
Sandy clay	70.29	27.47	1.33	0.90	trace	..	..	2.558
Pipe "	61.39	36.61	1.54	0.46	..	..	..	..
Blue "	53.52	43.89	1.20	1.39	..	..	..	..
Red "	52.11	36.19	8.17	1.56	2.04	..	..	..
Fire "	69.33	23.62	5.56	1.49	trace	..	..	..
Yellow "	65.06	30.68	3.70	0.56	..	..	..	..
China, porcelain vase	70.50	20.70	0.08	0.05	0.01	..	6.00	..
China, porcelain plate	58.50	28.50	0.03	0.06	trace	..	5.00	..
Berlin	66.60	28.00	0.70	0.30	0.6	..	3.40	..
Vienna (1806)	61.50	31.60	0.80	1.80	1.4	..	2.20	..
Meissen	57.70	36.00	0.80	0.30	trace	..	5.20	..
Paris, mean of many	58.00	34.30	..	4.50	..	..	3.00	..
English china ware, No. 1	39.88	21.48	..	10.06	..	26.44	2.14	..
" " No. 2	40.60	24.15	..	14.22	0.43	15.32	5.28	..
" " No. 3	39.68	24.65	..	14.18	0.31	15.39	5.79	..
Berlin ware	72.96	24.78	..	1.04	trace	..	1.22	2.419
Superior china ware	71.04	22.46	..	3.82	..	..	2.68	2.314
Inferior "	68.96	29.24	..	1.60	..	..	..	2.314
Common English white ware	68.55	29.18	..	1.24	..	..	..	2.360

—The mixtures for true porcelain are much more simple than those for the soft porcelain. They consist chiefly of kaolin and ground feldspar, the proportions varying in the same establishment with the varying composition of the kaolin, which is a natural mixture of decomposed feldspar with particles of the same mineral undecomposed and also of quartz, all which by grinding and mixing are thoroughly incorporated together. A little carbonate of lime is also introduced. The mixture should give as near as may be the proportions of the Paris ware in the foregoing table, and this at one time may be presented by the following quantities:

Materials.	Parts.	Constituents.			
		Silica.	Alumina.	Lime.	Potash.
Kaolin	48	30.00	16.90	0.05	0.96
Feldspathic sand	48	28.30	17.04	0.58	2.01
Lime	4	..	..	4.00	..
Total	100	58.30	33.94	4.58	2.97

It is remarkable that mixtures of the pure materials in these and similar proportions fail entirely to produce the porcelain structure. This is attainable only by the use of the natural mineral compounds. The glaze is also feldspar, to which a little gypsum is sometimes added, but no metallic oxide. It is slightly more fusible than the mass, and being of the same nature with it a thorough adhesion of the two readily takes place, and no liability is incurred of the splitting into a fine network of cracks, known as crazing, which is not unusual with the glazes of other wares. This glaze is also much harder and wears better than those containing lead.—Some of the mixtures for white fine stoneware may be as follows, the first series being adapted for jugs, pitchers, &c., and the second for Wedgwood mortars:

Materials.	I.	II.	III.	IV.	I.	II.	III.	IV.
Cornish stone	80	40	100	80	200	90	50	50
Kaolin	20	10	20	10	..	80	20	40
Blue clay	40	20	18	18	60	80	25	20
Flint	20	..	40	2	..	..	..	..
Glass	..	..	..	..	..	..	1	..

When it is desirable to glaze these wares, the effect is produced by "smearing" over the inside of the seggars a wash of certain mixtures of salt, nitre, oxide of lead, &c., in hot water, as flint powder 10 parts, bone ash 5, nitre 3, salt 5; or lead 6, Cornish stone 3, salt 3. Volatile portions of these, as the salt and lead, combine in part with the silica of the mass, and thus a thin glaze is laid over the surface of the ware. The composition of several varieties of stoneware in 100 parts is seen in the following table:

	Locality.	Silica.	Alumina.	Ox. iron.	Lime.	Magnesia.	Alkali.	Loss.	Description.
Glazed.	St. Amand....	75.00	22.10	1.00	0.25	trace	0.84	0.31	Common body of earthy glaze.
	Helsingborg..	74.60	19.00	4.25	0.62	trace	1.30	0.28	Coarse grayish body, ill moulded, salt glaze.
	Volsinlieu	74.30	19.50	3.90	0.50	0.30	0.50	0.50	Fine whitish body, well moulded, salt glaze.
	Vauxhall	74.00	27.04	2.00	0.60	0.17	1.06	0.13	Fine whitish body, well moulded, external surface porous, salt glaze.
	Frechen......	64.01	24.50	3.50	0.56	0.92	1.42	0.09	Dark brown body, fine, well moulded, covered with earthy glaze.
Unglazed.	Baltimore	67.40	29.00	2.00	0.60	..	0.60	0.40	Very fine whitish body.
	Wedgwood...	66.49	26.00	6.12	1.04	0.15	0.20	..	Very fine yellowish body, very sonorous, well moulded.
	Saveignies....	65.60	27.64	4.25	1.12	0.64	0.24	0.31	Clear brown body, coarse, very sonorous.
	Japan	62.04	20.30	15.58	1.08	trace	traco	1.00	Very fine body, well moulded, deep brown red color.
	China	62.00	22.00	14.00	0.50	trace	1.00	0.50	Do. do.

For fine earthenware a great diversity exists in the proportions of the ingredients employed. Some of the mixtures are as follows:

Materials.	Ironstone china bodies.			Turquoise body.	Fine earthenware bodies.		
Cornish stone.....	130	200	70	60	75	300	200
Kaolin............	120	150	50	175	200	300	650
Blue clay.........	60	100	30	300	200	500	500
Flint.............	30	120	25	200	200	300	450
Turquoise stain...	..	..	..	20	..	..	..

The turquoise stain consists of 1 lb. blue cobalt, 2¼ lbs. flint, and 10 lbs. oxide of zinc, calcined together and finely ground. Numerous receipts are given of colored clay mixtures for ornamentation.—The preparation of the crude materials for shaping into articles of pottery is a work of no little labor and time. The manner of collecting the kaolin is noticed in the article CLAY. All the other materials are ground to very fine powder, and are then mixed by stirring them with water in large cisterns. The surplus water is afterward removed from what is now called the slip by various methods. It is absorbed by the gypsum bottoms of the boxes into which it is drawn, or pressed out through linen bags, or separated by filtration aided by exhausting the air from below the filter. When reduced to the consistence of dough it is then to be worked over thoroughly by kneading, treading, beating, &c. Porcelain paste especially requires long continued working, and should after this be stored away moist for a year or more to go through the "moulding" process, by which its plasticity is increased. Finally it is worked over by the slapping process, which consists in dashing the lumps into which it is cut by a brass wire against each other and thus incorporating them together. Form is given to the articles either by the potter's wheel, a process known as "throwing," or in moulds by "casting" and "pressing." The potter's wheel has experienced little change since its use in Egypt 2,000 years B. C. It is a flat disk upon an upright axle, turned by a belt from another wheel, by hand, or by the foot of the workman applied to a wheel attached below to its axle. The potter throws upon the centre of the disk a lump of clay cut by the brass wire of the slapper into the exact size of the piece to be made, and as it slowly revolves as in a lathe he shapes it with his hand, hollowing out a cavity for the interior of the vessel and giving to the exterior its true outline. When the cavity is too small to admit the hand, he uses some simple tool, as a wet sponge attached to a crooked stick, and for the outside when exactness of form is required a piece of metal having the profile of the intended article. Some articles roughly formed at first are allowed to dry partially before the shaping is completed. Moulds are made of gypsum, which partially absorbs the moisture in the paste. They are single for the simpler forms, shaping but one surface; others are double for giving the shape to both surfaces; and others are in several parts for moulding complicated forms, which, made separately, are afterward united together. The thin slip or paste is prepared for the mould in a sheet either by "throwing" or by rolling, after the manner of rolling dough; and if for a plate, it is laid over and pressed down with a wet sponge upon the mould for forming its inner surface, which mould is set upon a revolving disk, and as this carries the sheet round the surface is shaped by a metallic profile of the intended shape brought in contact with the paste. The manipulations of this sort are greatly varied according to the work in hand. Handles, spouts, and the ornamental pieces are separately moulded and then attached by means of slip. After being moulded the vessels require a careful revision, usually on the potter's wheel, in which all roughness and excess of paste is removed, and sometimes an ornamental surface produced by a delicate sort of carving with the knife. The effect of lace upon the drapery of figures is very ingeniously obtained by attaching to the paste real lace dipped in slip, which is afterward destroyed in the firing. In the drying distortion is very apt to occur from the moisture not going off uniformly, thus causing unequal shrinkage. Great pains are taken to guard against this, and the pieces are put upon shelves and very slowly dried, away from the direct rays of the sun and from artificial heat. The application of glaze to porcelain biscuit (that is, after a preparatory firing) is made by dipping the vessels into tubs containing the glaze composition in slip suspended in water.

The dipping is done as quickly as possible, and the composition is then brushed off from those parts which would come in contact with the support upon which the pieces are to rest. The firing is conducted in tall cylindrical kilns, like glass furnaces, into which the flames pass through flues from outside fireplaces. The articles to be baked are carefully placed in drum-shaped clay vessels, called seggars, which when filled are piled upon each other, forming columns that fill the kilns. These must necessarily be capable of withstanding greater heat than that required for the articles they contain, and upon the possibility of producing such vessels at moderate cost the success of the porcelain manufacture in any locality is chiefly dependent. The time required for the firing varies in different places and for different wares, but for French porcelain it is usually from 25 to 30 hours. When this is completed the kiln is closed up and left from 5 to 8 days for the ware to anneal. When it is removed a portion, sometimes amounting to $\frac{1}{4}$, is found to be misshapen and ruined, and all the pieces require a final revision and dressing with a stone, grinding wheel, &c.—The pigments used for painting porcelain consist of a flux with a coloring ingredient, which is commonly a metallic oxide. Those colors which withstand the high heat of the kiln are termed refractory colors, and are applied before glazing. The others, termed muffle colors, from the kind of furnace in which they are burned in, are applied after the baking, and therefore involve an additional process; and as the tint of some of them varies with the temperature, this is carefully watched and regulated. Gold is applied in its precipitate mixed with $\frac{1}{15}$ its weight of oxide of bismuth, and rubbed up with thickened oil of turpentine. This is applied with a brush, and after firing the gilding is brought out by burnishing.—The variety of porcelain biscuit called Parian or Carrara ware was introduced about the year 1845 in England, and has since been employed as a beautiful material for statuettes, which resemble the marble itself. It differs from porcelain chiefly in the use of a feldspar more fusible than the Cornish stone. Its application to the production of models has engaged the attention of eminent sculptors and potters in England, and exquisite small works of art are now cheaply furnished in it. The work, however, requires great care and skill, the figures being cast in different parts, which are afterward united together. A very thin slip is poured into the mould, and a considerable time is allowed for it to harden before it is removed. The parts not well supported are kept in place by props until the mass has acquired sufficient consistence.—In Europe the forming of collections of pottery has been an object of interest not only to numerous wealthy amateurs, but also to the governments of states. In England more than 100 such collections are noticed by Joseph Marryat, several of which are limited to a special variety of ware alone. In Dresden is the national collection of the Japanese palace founded by the elector Frederic Augustus I. In this collection the oriental china alone occupies 18 large rooms. The progress of the Dresden manufacture is represented by a great variety of well selected pieces. The museum of the porcelain works at Sèvres was arranged by M. Alexandre Brongniart, commencing in 1812, for the purpose of illustrating the progress of the ceramic art from the manufacture of the rudest ware to that of the finest porcelain, and also the geography and chronology of the art. The collection is eminently of a practical character, made up of illustrative specimens alone not merely of the finished works, but of the materials used in the manufacture in all parts of the world. Each one of these, to entitle it to a place in the collection, must be provided with a label describing its character, locality, date, use, &c. This manufacture affords an eminent instance of the value imparted to worthless materials by skill and science. Single vases of Sèvres china 12 to 15 inches high have repeatedly sold for $5,000, Majolica plates for $600, Chinese kylins or antique vases for $1,500, &c.; and the market is constantly rising, as with every improvement in the modern art choice antique specimens are more eagerly sought.—The principal works on pottery are: A. Brongniart, *Traité des arts céramiques ou des poteries considérées dans leur histoire, leur pratique, et leur théorie* (Paris, 1844); A. Brongniart and D. Riocreux, *Description méthodique du musée céramique de la manufacture royale de porcelaine de Sèvres* (Paris, 1845); Joseph Marryat, "A History of Pottery and Porcelain, Mediæval and Modern" (2d ed., London, 1857); Samuel Birch, F.S.A., "History of Ancient Pottery" (London, 1858); and Knapp's "Chemical Technology."

POTTO (*cercoleptes*, Illig.), a genus of carnivorous mammals, of small size, inhabiting tropical America. They resemble the bears in their plantigrade movements and in their dentition, but differ in other characters; they seem to form the connecting link between the quadrumana and the plantigrade carnivora. The molars are $\frac{5-5}{5-5}$, small, the anterior 2 conical, and the others tuberculate with flat crowns, canines short and blunt; muzzle short and rounded; the eyes large; the tongue slender, long, and extensile; tail long, hairy, and prehensile; feet plantigrade, but the 5 toes are separate, capable of independent motion, and provided with sharp claws; legs short; fur woolly. The common potto, sometimes called kinkajou (*C. caudivolvulus*, Illig.), is about the size of a cat, but more slender, of a general yellowish brown color, sometimes reddish brown; in form and habits it resembles the lemurs, and is nocturnal, an excellent climber, using the fore paws like the squirrels to convey food to the mouth; it is omnivorous, feeding on fruits, honey, insects, eggs, and small birds and mammals, like other plantigrades; it is fond of plundering the nests of wild bees, obtaining the honey by means of its long tongue, whence it has received the name of honey bear; it is a native of Guiana, New Granada, Peru, and some of the West India islands. Being gentle and playful in disposition, it is often tamed as a pet, and is not uncommonly seen in menageries.—Potto is also the native name of an African lemur. (See Lori.)

POTTSVILLE, a village of Norwegian township, and capital of Schuylkill co., Penn., on the Schuylkill river at the entrance of Norwegian creek; pop. in 1860, 9,454. It is the terminus of the Philadelphia and Reading railroad, by which it is 93 m. N. W. from the former and 35 m. from the latter. The village is situated near Sharp mountain, on a very uneven surface, in the midst of an extensive coal region, from which its chief source of prosperity is derived. It contains, beside the county offices, 4 founderies and machine shops, a brass foundery, an iron safe manufactory, a steam factory of sashes and woodwork, 3 English and 3 German weekly newspapers, a Welsh monthly magazine, and 16 churches, viz.: 1 Baptist, 2 Episcopal, 1 Evangelical, 1 German Reformed, 3 Lutheran, 1 Methodist, 2 Presbyterian, 2 Roman Catholic, and 3 Welsh.

POUCHED RAT. See Gopher.

POUCHET, Félix Archimède, a French physician, born in Rouen, Aug. 26, 1800. He studied medicine in his native city, and subsequently in Paris, where he was admitted to practice in 1817. Upon his return to Rouen he was named professor of natural history in the museum just founded there, and in 1838 professor in the Rouen medical school. He has written *Zoologie classique, ou histoire naturelle du règne animal* (2 vols. 8vo., Rouen, 1841); *Recherches sur l'anatomie et la physiologie des mollusques* (4to., 1842); *Théorie positive de l'ovulation spontanée et de la fécondation des mammifères et de l'espèce humaine* (8vo., 1847), and other works.

POUGHKEEPSIE (said to be from Ind. *Apo-keep-sink*, pleasant harbor), a city and the capital of Dutchess co., N. Y., on the E. bank of the Hudson river and on the Hudson river railroad, 75 m. N. from New York and 69 m. S. from Albany; pop. in 1860, 15,000. The greater portion is built on a table land, from 150 to 200 feet above the river. About a mile back is a hill, 500 feet above the river, on which is the Poughkeepsie collegiate school. From this eminence the eye has a range of about 2,500 sq. m. The city is regularly laid out, and has good public buildings and many elegant private residences. It contains a city hall, 4 banks, a savings bank, an academy, 6 public schools with 1,900 pupils, a law school, lyceum, and orphan asylum and home for the friendless. It has a public library containing about 6,000 volumes. A rural cemetery of 54 acres has been laid out a short distance below the city. There are a number of manufactories, the principal of which are the Poughkeepsie iron works, with a capital of $200,000; a carriage factory, capital $35,000; carpet factory, $60,000; chair factory, $60,000; and M. Vassar and co.'s brewery, capital $150,000, which makes 30,000 bbls. of ale per annum. There are 21 churches, viz.: 2 Baptist, 1 Congregational, 3 Episcopal, 1 Friends', 1 Jewish, 1 Lutheran, 5 Methodist, 1 Presbyterian, 2 Reformed Dutch, 2 Roman Catholic, and 1 Universalist. On June 4, 1861, ground was broken for the foundation of the Vassar female college, for the erection and endowment of which Matthew Vassar, Esq., of Poughkeepsie, has given $400,000. It is incorporated by a charter granted by the legislature in Feb. 1861, and its affairs are in the hands of a board of trustees. It is to be completed in 1863. Steamboats ply between Poughkeepsie and New York, and the New York and Albany steamers touch here; and it is connected by a steam ferry with New Paltz on the opposite side of the river.—Poughkeepsie was originally settled by several Dutch families in 1690–1700. In 1778 the legislature was convened by Gov. Clinton at the Van Kleeck house, a stone building pierced for musketry and used for defence, and among other acts gave its assent to the articles of confederation; and it was here on July 26, 1788, that the national constitution was ratified in the state convention assembled for the purpose of its consideration. Poughkeepsie received a city charter in 1854.

POUILLET, Claude Servais Mathias, a French physicist, born at Cuzance, department of Doubs, Feb. 16, 1791. He was educated at the normal school, was successively a professor there, at the Bourbon college, the polytechnic school, and the Sorbonne, was preceptor to the sons of Louis Philippe, and finally director of the *conservatoire des arts et métiers*. He was also an opposition member of the chamber of deputies, and opposed the *coup d'état* of Louis Napoleon. He has written extensively on physics and electricity.

POUJOULAT, Jean Joseph François, a French author, born at La Fare, department of Bouches-du-Rhône, Jan. 26, 1808. Having been educated at the college of Aix, he went to Paris in 1826, and became acquainted with M. Michaud, whom he assisted in preparing his *Bibliothèque des croisades*, and in 1830 accompanied him on a tour through the East, an account of which they published in their *Correspondance d'Orient* (7 vols., Paris, 1833–'5). He subsequently edited with Michaud the *Nouvelle collection des mémoires pour servir à l'histoire de France depuis le* 13e *siècle jusqu'à la fin du* 18e (32 vols. 8vo., 1836–'9), and has since published many works upon historical and literary subjects.

POUND (Lat. *pondus*, a weight), a measure of weight. As mentioned under Avoirdupois, two different pounds are in use. One is called the avoirdupois or commercial pound, and is equal to 7,000 grains; and the other the apothecaries' or troy pound, of 5,760 grains. (See Avoirdupois.)

POUND (Anglo-Sax. *pund*, a fold), in law, en, pinfold, or enclosure of any kind au-orized by law and belonging to a town, y, or county, in which horses, asses, mules, ep, goats, and swine that are wandering ray, or are trespassing, may be confined until emed and taken out by the owner, by due ocess of law or in a lawful way. The prac-e of impounding stray or mischievous cat- is extremely ancient in England, and was opted by the American colonies from their ginning. The whole process is carefully gulated by statutes in the United States. he provisions of these statutes differ very uch. Perhaps the most important of the evailing principles of law on this subject sting however on authority rather than upon atutes) is, that a pound keeper is bound to ceive every animal offered to his custody in e form of law, and is not amenable whether he animal be pounded for legal and sufficient use or otherwise.

POUND STERLING, a denomination of oney, originating from the pound weight of lver, which anciently was divided into 240 ces called pence. These pence were desig-ated *esterling*, whence the name "sterling," the gal description of the English current coin. his is supposed to have been derived origi-ally from Easterlings, the popular name of aders from the Baltic and from Germany, who visited London in the middle ages, and some of whom were probably employed in coining. The pound sterling is a money of ac-count; the gold coin representing it is called a sovereign, whose current value in U. S. money is $4.86, and its actual value slightly more.

POUNDS, John, an English philanthropist, born in Portsmouth in 1766, died there, Jan. 1, 1839. Being crippled by an accident in his youth, while working in the royal dockyard at his native place, he took up the occupation of a cobbler. At the age of 22 he undertook to support a child of his brother's, who was a cripple from inversion of the feet. After many efforts he succeeded in restoring the child's limbs to their true position, and commenced teaching him to read. Thinking that he would learn faster if he had companions, he invited a poor neighbor to send his children to his shop for instruction, and in a few months extended the invitation to other families, till his shop, 6 by 18 feet, was filled with scholars. These, by processes of his own contrivance, which bore a strong resemblance to Pestalozzi's, though he had never heard of that celebrated educator, he instructed in the rudimentary branches, and under his tuition they gained as thorough a mastery of them as the children in the best public schools. There were always many more applicants for admission into his school than his little shop would hold; but when there was a vacancy he always selected the most turbulent and vicious children, and seldom failed to make them quiet and well behaved. Without any pecuniary assistance from others, and amid great poverty and privations, he maintained this "ragged school" to the very day of his death, a period of nearly 50 years. His school, though a little later than that of Tata Giovanni (see *Borgi, Giovanni*), was prompted by the same motives, and was, at least in Great Britain, the beginning of "ragged schools," since so extensively established in the United Kingdom and elsewhere.

POUSSIN. I. Nicolas, a French painter, born in Andelys, Normandy, in 1594, died in Rome, Nov. 19, 1665. He was descended from an ancient but impoverished family of the French nobility, and was carefully instructed in literature and the sciences under the supervision of his father. He acquired the elements of his art from two French painters of moderate ability, but received his first ideas of style and composition from studying engravings of the works of Raphael and Giulio Romano. The Italian poet Marino, struck by some of his earlier efforts, induced him to visit Rome, where he arrived in 1624, and was presented to Cardinal Barberini. The departure of this prelate from the city and the sudden death of Marino left him, without friend or patron, to struggle for himself, and for several years he earned a bare subsistence by disposing of his pictures for trifling sums. At this time he lived with the sculptor François du Quesnoy, and under the influence of this association, as well as of the tastes with which his classical training had imbued him, he made close studies of the most celebrated antique statues and bass-reliefs. He also profited much by the pictures of Raphael and Domenichino, but his style was founded mainly on the antique; and so engrossing were his studies of the ancient statues that, as Sir Joshua Reynolds has observed, "he may be said to have been better acquainted with them than with the people who were about him." Fuseli, in allusion to his enthusiasm for the antique, said that "he painted basso-rilievo." His "Death of Germanicus" and "Capture of Jerusalem by Titus," painted for Cardinal Barberini, first brought him into notice, and in 1639 his reputation was so well established that Louis XIII. sent him a special invitation to France, made him his first painter in ordinary, with a pension, and lodged him in the Tuileries. The jealousy of Simon Vouet and other rival artists rendered his life uncomfortable, and in 1642 he gladly availed himself of an opportunity to return to the more congenial atmosphere of Rome, promising however to revisit Paris. The death of Louis and of Richelieu in the succeeding year afforded him an excuse for refusing to fulfil his engagement, and the remainder of his life was passed in Rome. He lived quietly and unostentatiously, absorbed in the practice of his art, and produced subsequent to his return from France many easel pictures of large size, which he readily disposed of at moderate prices. So liberal was his disposition, that notwithstanding his frugal life he left at his death a property amounting to only 15,000 Roman scudi. As a painter of history, classical mythology, or allegory, and of landscape, Poussin was one of the most remarkable and learned of his age; and his works, which are widely dispersed among public and private galleries, are still held in great esteem. His historical works, according to Dr. Waagen, represent three distinct periods: the first, comprising his early residence in Rome, being distinguished by hardness of outline, thin coloring, and defective composition; the second, by excellence of composition and expressive heads; and the third, by an imitation of the antique which finally becomes mannered and monotonous. Of his large historical pieces the Louvre contains a noble collection, including the "Deluge;" "Rape of the Sabines;" "Eliezur and Rebecca;" the "Finding of Moses;" "Christ appearing at the Prayer of St. Francis Xavier and healing a Japanese Woman," which Waagen calls the best of all his altarpieces; and "Christ healing the Blind Man of Jericho," according to the same authority, the most satisfactory of his later works. In the same collection are his celebrated *Et in Arcadia Ego*, aptly described as "a noble pastoral in which the mutability of all earthly things is suggested in the finest and most touching manner;" and "Eurydice bitten by the Serpent," conveying a similar moral, and like its companion picture distinguished by its sentiment of repose and its grand and simple landscape. The Louvre also contains the series of "Four Seasons," painted during the last 5 years of his life. In the British national gallery are some of the finest of his purely classical or mythological subjects, one of which, the "Dance of the Bacchanals," reflects so completely the spirit of antique sculpture that it might have been copied from the bass-reliefs of a Grecian urn. But the most celebrated of Poussin's works in England are the two sets of the "Seven Sacraments" in Belvoir castle and the Bridgewater gallery. In the latter collection is also a fine picture of "Moses striking the Rock," and in that of Mr. Miles at Leigh Court the well known "Plague of Athens." Scattered throughout his works are also pieces from sacred and profane history of much sweetness of tone and expression; "a proof," observes Mrs. Jameson, "that Nicolas Poussin could be, when he chose, a poetical and effective colorist." On the other hand, he could descend to the most revolting treatment of a subject, as in his "Martyrdom of St. Erasmus" in the Vatican, in which the entrails of the saint are in the act of being wound out of his body by a windlass around which they are twisted; a work justifying the remark of Diderot, that if all the martyrdoms painted by great masters should escape the ravages of time, posterity would regard the present race of men as "ferocious beasts or anthropophagi." Notwithstanding his pedantry and faults of style and color, Poussin was, in the estimation of Kugler, "a great man, and his pictures bear characteristics of the highest genius and the most refined taste." As a painter of ideal landscape, according to the same authority, "his conception of nature is serious and solemn; a grandeur of form prevails as in his historical works, while his coloring, which never possesses great charm, is sometimes almost harsh." His landscapes are commonly embellished with ancient architecture or figures taken from classic mythology and history, and present excellent specimens of what is called the "heroic" style of this department of painting. II. Gaspar, brother-in-law of the preceding, born in Rome in 1613, died there in 1675. His family name was Dughet, but after the marriage of Nicolas Poussin with his sister, he was adopted by Nicolas, who had no children, and assumed his name. Under the instruction of his brother-in-law he became very eminent in the department of landscape, depicting the finest scenery in the vicinity of Rome, Tivoli, and Frascati, and, in imitation of his master, composing ideal pictures. He was a rapid and facile painter, firm in his handling, and so careful a student of nature that he gave to every tree and shrub the peculiar character of its species. For aërial effects and chiaroscuro he was almost unrivalled, although his pictures frequently have a sombre tone, which is believed to be the effect of time. In his earlier works he followed the manner of Nicolas, with which he subsequently combined striking peculiarities of his own. His composition, though founded on the heroic style, having a brighter and freer character, which forms a happy contrast to the severe earnestness of his master. He improved his color by studying the works of Claude Lorraine. Kugler says: "It is what may be called the living soul of landscape which first appears with its full effect in Gaspar Poussin's works." His peculiar skill in aërial effects was shown in his land storms, which he executed with remarkable power, and of which a well known example, representing Dido and Æneas taking refuge from the tempest in a cave, is contained in the British national gallery. In the same collection is a landscape entitled "Abraham and Isaac going to the Sacrifice," which has been called the painter's masterpiece.

POWELL, Baden, an English clergyman and author, born in 1796, died in London, June 11, 1860. He was graduated at Oxford in 1817, and in 1827 was elected Savilian professor of geometry in that university, which appointment he held until his death. He was active in his efforts to introduce into the university a greater attention to the natural sciences, and although in holy orders, he held no living. His writings are either strictly scientific in their character, or treat of the connection between science and theology. Among the former may be mentioned a "History of Natural Philosophy" (1834); "A General and Elementary View of the Undulatory Theory of Light" (1841); and a large number of papers in the transactions of various scientific societies, of ch the most remarkable were "Reports on minous Meteors," "On the Repulsive Power Heat," "On the Dispersion of Light," "On etic Polarization of Light," and "On Irra- tion." Of the second class may be mention- "The Connection of Natural and Divine th, or the Study of the Inductive Philoso- considered as subservient to Theology" ndon, 1838); "Essays on the Spirit of the uctive Philosophy, the Unity of Worlds, the Philosophy of Creation" (1855); ristianity without Judaism" (1857); "The der of Nature considered with reference to Claims of Revelation" (1859); and "On Study of the Evidences of Christianity," in ssays and Reviews" (1860). The purpose hese works of the latter class was to maintain the rejection of ideas generally prevalent n theological subjects, which in the prog- of modern science have been called in estion, or at least modified, is in no way a drance to a sincere belief in the cardinal ths of religion.

POWER of a quantity, in mathematics, the ult obtained by multiplying that quantity a rtain number of times by itself. Thus, the power of 2 is $2 \times 2 = 4$; the 3d power, $2 \times 2 = 8$. The degree of the power, or e number of times that the given quantity is ken as a factor, is expressed by a number lled the exponent, written above and at the ght of the quantity; thus, 2^3 denotes the 3d wer of 2, and 2 is styled the root of 2^3.

POWER, TYRONE, an Irish actor and author, rn in county Waterford in 1795, perished at a in 1841. His mother, having been left a dow during his infancy, removed to Glamor- anshire, South Wales, and in the theatre of e neighboring town of Cardiff Tyrone made debut upon the stage as Romeo. For a umber of years subsequent he performed at fferent provincial theatres, attempting both mic and pathetic parts, although the former ere better suited to him. In 1818 he retired om the stage, but in 1821 reappeared at sev- al London theatres. His first decided suc- ess in the metropolis was achieved in 1824 in e part of Paddy O'Halloran, and thenceforth found it to his advantage to devote his abili- es exclusively to the delineation of Irish char- cters, in which he was unrivalled. To a prepos- ssing personal appearance he united a viva- ious air, a genuine appreciation of Irish hu- mor, a rich brogue, and a fine taste for singing. hese qualities made his personation of such arts as the "Irish Tutor," Rory O'More, Mur- ch Delany, "Teddy the Tiler," Sir Patrick Plenipo, Phelim O'Flannigan, and many oth- rs, written expressly for him, among the tri- mphs of the comic stage. In 1833 he visited e United States, where he obtained great suc- ss in his leading parts; and in 1840 he made nother professional tour in North America. e embarked March 11, 1841, for Europe in the steamship President, which was never subse- uently heard of. Power was the author of "Impressions of America" (2 vols. 8vo., London, 1836); "The King's Secret," a novel; "The Lost Heir," &c. He was a man of genial habits, and much amiability and native humor.

POWERS, HIRAM, an American sculptor, born in Woodstock, Vt., July 29, 1805. He was the 8th of a family of 9 children, and passed his youth on his father's farm, acquiring the rudiments of a district school education, and some knowledge of drawing and of various kinds of handicraft. The farm proving unsuccessful, he emigrated with the family to Ohio, and upon the death of his father soon after established himself in Cincinnati, where, after being successively employed in a reading room connected with one of the hotels and in a produce store, he procured a situation with a clockmaker, for whom he collected debts, beside aiding in the mechanical part of the business. About this time he became acquainted with a German sculptor, from whom he learned the art of modelling in plaster, and after a little practice he was able to produce plaster busts of considerable merit. The taste for art fostered by this employment induced him to form a connection with the western museum at Cincinnati, the waxwork department of which was for 7 years under his direction. Aspiring to a higher walk in his profession, and feeling that he might depend for a support upon his labors as a sculptor, he repaired in 1835 to Washington, and was for some time profitably employed in modelling busts of distinguished men. With the proceeds derived from these efforts, and by the assistance of Mr. Nicholas Longworth of Cincinnati, he was enabled in 1837 to carry into effect a long cherished desire to visit Italy. In the same year he established himself in Florence, which, with the exception of occasional visits to Rome and elsewhere, has continued ever since to be his home, and for several months devoted himself chiefly to modelling busts. Gradually gaining confidence in his powers and facility in the use of the chisel, he produced in 1838 an ideal statue of Eve, which excited the admiration of Thorwaldsen, who pronounced it a work which any sculptor might be proud to claim as his masterpiece. A year later he finished the model of his "Greek Slave," his most widely known and popular work, and of which upward of 6 duplicates in marble are in existence, beside an immense number of plaster casts and reduced copies in parian. Among other well known works by him are the "Fisher Boy," of which 3 repetitions in marble have been produced; "Il Penseroso;" "Proserpine," a bust; "California;" "America," modelled for the crystal palace at Sydenham, England; and portrait statues of Washington for the state of Louisiana, and of Calhoun for South Carolina. The latter, his best work of the kind, after suffering shipwreck off the coast of Long Island, was safely deposited in Charleston. Of his busts, which comprise by far the greater part of the productions of his chisel, those of Adams, Jackson, Webster, Calhoun, Chief Justice Marshall, Everett, Van Buren, and other distinguished Americans, are well known and striking specimens. One of his latest productions is a bronze statue of Webster, now erected in the state house grounds at Boston. Mr. Powers is the inventor of a process of modelling in plaster which, by obviating the necessity of taking a clay model of the subject, greatly expedites the labors of the sculptor.

POWERS, Mechanical. See Mechanics.

POWESHIEK, a S. E. co. of Iowa, drained by the North fork of Skunk river, which traverses the S. W. corner, and Beaver, Sugar, and other creeks; area, 576 sq. m.; pop. in 1860, 5,670. It has a fertile soil. The productions in 1859 were 20,470 bushels of wheat, 6,698 of oats, 241,500 of Indian corn, 10,785 of potatoes, 4,096 tons of hay, 4,736 galls. of sorghum molasses, 73,572 lbs. of butter, and 5,266 of wool. Capital, Montezuma.

POWHATAN, a S. E. co. of Va., bordered N. by the James river and S. by the Appomattox; area, about 300 sq. m.; pop. in 1860, 8,391, of whom 5,403 were slaves. It has a level surface and a naturally fertile soil, much of which, however, has been exhausted. The productions in 1850 were 215,155 bushels of Indian corn, 115,437 of wheat, 89,189 of oats, 1,000,490 lbs. of tobacco, and 14,671 of wool. There were 19 churches, and 305 pupils attending schools. Value of real estate in 1856, $1,927,639, showing an increase of 26 per cent. since 1850. Capital, Scottsville.

POWHATAN, a sachem of great authority among the Indian tribes of Virginia at the time of its colonization, died in 1618. He was a man of great native talent, and had raised himself from the rank of a chieftain to the command of 30 tribes, which numbered about 8,000 souls. His dominions included the country between the rivers James and Patuxent, and in the interior as far as the falls of the chief rivers. Of his two places of abode, Powhatan, on the present site of Richmond, was a village of 12 wigwams only; but a guard of 40 warriors constantly attended his person, and his dwelling was watched at night by 4 sentinels. After the extension of his power northward, however, he resided principally at Werowocomoco, on York river, in the present county of Gloucester. He was disposed to look with dislike upon the coming of the whites, though when the first expedition under Newport and Smith visited him at his residence in Powhatan, he treated them with hospitality. Subsequently, Smith having been taken prisoner and about to be despatched by clubs, Powhatan, through the intervention of his daughter Pocahontas, spared his life, and ultimately sent him to Jamestown with strong protestations of regard. During another visit from the English, Powhatan succeeded in overreaching Newport in trade; but an equivalent advantage was obtained by Smith, who exchanged a pound or two of blue beads for 200 or 300 bushels of corn. When Newport subsequently returned to Virginia from England, he was commissioned to discover the South sea; and as he was obliged to pass through Powhatan's territory a number of presents were brought him, one of which was a crown, and the ceremony of coronation was performed a few days later, while in order to have him stoop it was found necessary to lean hard upon the shoulders of the Indian monarch, whose comprehension of the ceremony seems not to have been very clear. For the honor shown him, Powhatan gave Newport his mantle and old shoes. Capt. Smith afterward made an unsuccessful attempt to capture the "emperor" in order to obtain a supply of corn; and in revenge for this, Powhatan prepared to attack the English by night, but was foiled by the watchfulness of Pocahontas. The quarrels between Powhatan and the English did not cease until the marriage of his daughter with Rolfe, after which he was their firm friend.

POWNALL, Thomas, an English statesman and author, born in Lincoln in 1722, died in Bath in 1805. He emigrated to America in 1753, and in 1757 was appointed governor of the colony of Massachusetts Bay. Having been recalled at his own request, he succeeded Sir Francis Bernard as lieutenant-governor of New Jersey in 1760, and soon afterward became governor of South Carolina. In 1761 he returned to England, was made comptroller-general of the expenditures of the army in Germany, and in 1768 was elected to parliament. He earnestly opposed the measures of the government against the colonies. After being [illegible] times returned to parliament, he retired in 1780, and passed the remainder of his life in antiquarian studies. His principal works are: "Description of the Middle States of America" (1776); "A Memorial to the Sovereigns of Europe on the State of Affairs between the Old and the New World" (1781); "A Memorial to the Sovereigns of America" (1783); "Notices and Descriptions of the Antiquities of the Provincia Romana of Gaul" (4to., 1788); "Intellectual Physics;" "Principles of Polity;" "Administration of the Colonies;" and a "Treatise on Old Age."

POZZO DI BORGO, Carlo Andrea, count, a Russian diplomatist, born in Alala in Corsica, March 8, 1768, died in Paris, Feb. 15, 1842. He was descended from a noble but impoverished family, and after receiving an elementary education in his native country completed his studies at Pisa. At the outbreak of the French revolution he was an advocate in Corsica, and intimate with the Bonaparte family. He embraced liberal views, and was sent to Paris with Gen. Gentili to offer to the constituent assembly the thanks of Corsica for having declared that island an integral portion of the territory of France. He was elected to the French legislative assembly in 1791, joined the Girondists, and acted zealously with the war party; but falling under suspicion, he returned to Corsica

er the dissolution of the assembly, attached
mself to the party of Paoli, and when the
and was freed from the dominion of France
came president of the council. When the
glish withdrew he went to London, and there
the agent of the French refugees began his
reer as a diplomatist. He had entirely broken
ith the Bonapartes, and his sympathies were
ogether with the anti-Gallican party. In
98 he went to Vienna in order to bring about
coalition between Austria and Russia against
rance, accompanied Suwaroff in his campaign
1799, and in 1802 entered the Russian ser-
ce as councillor of state. As Russian com-
issioner he was despatched in 1805 to the
ussian, English, and Neapolitan army in the
rth of Italy, was subsequently sent on va-
ous missions to Prussia and Austria, and was
resent in the battle fought off the isle of
enedos, July 1, 1807, between the Russian and
rkish fleets, in which the former was victo-
ous. On account of the treaty concluded be-
een Alexander and Napoleon, Pozzo left the
ussian service in 1808, fearing that he would
delivered over to the latter, and succes-
vely went to Vienna, to Constantinople, and
1810 to London. After the close of the cam-
aign of 1812 he was recalled by the emperor
lexander. His whole influence was constantly
erved to keep Alexander steadfast in the war
gainst France, and the junction of Sweden
ith the allied powers is ascribed mainly to
is representations. In the beginning of 1814
went to England to secure the active co-
peration of that power, strenuously advocated
e bold resolution of marching upon Paris,
d in the congress of Châtillon opposed ac-
ding to the offers of Napoleon. After the
dication of the emperor he was made Rus-
an commissioner to the provisional govern-
ent, attended the congress of Vienna, and
fterward was ambassador at the French court.
e was present at the battle of Waterloo,
here he received a slight wound, and after
e second restoration was offered the post
minister of the interior, but declined it.
e remained in France in the capacity of Rus-
an ambassador, and signed the treaty of Paris
Nov. 1815. In 1823 he was made ambassa-
or extraordinary to Spain, but soon returned,
nd upon the accession of Nicholas to the
rone was created a count. He was ambas-
dor at Paris when the revolution of 1830 broke
ut, and in the following year his situation was
ceedingly unpleasant in consequence of the
ourse pursued by Russia in suppressing the
olish insurrection. So great was the detesta-
on of Russia in Paris, that on the arrival of
he news of the fall of Warsaw in Sept. 1831,
he populace came near storming Pozzo's hotel.
n 1833 he was recalled, but soon sent back.
e was afterward twice sent to London on
usiness relating to the eastern and Belgian
uestions, but after 1835 he retired from pub-
c life on account of his health, and lived in
aris until his death.

POZZUOLANA, a reddish, porous, friable mineral of volcanic origin. When reduced to a fine powder and mixed with lime, it forms a cement of stony hardness. It was discovered by the ancient Romans in the town of Puteoli (now Pozzuoli), and called *pulvis puteolanus.* They made great use of it in their submarine structures, as it hardens as well when immersed in water as when exposed to the air.

PRADIER, Jean Jacques, a French sculptor, born in Geneva in 1792, died in Paris in 1852. He belonged to a family which had left France after the revocation of the edict of Nantes, was sent to Paris while yet a boy, studied under the sculptor Lemot, and received from Napoleon a small pension. He gained a gold medal when 22 years of age, and the next year obtained by his "Philoctetes at Lemnos" the great prize of sculpture, which entitled him to a residence of 4 years in Italy at the expense of the government. At the exhibition of 1819 a gold medal was awarded to him, and in 1827 he was elected a member of the academy of fine arts, to fill the seat left vacant by his master Lemot. Among the most admired of his works are "Psyche," the "Three Graces," "Cyparissus," "Venus and Cupid," "The Bacchante and the Satyr," "Phryne," *La poésie légère* and the two muses which adorn the fountain of Molière in Paris, "Industry" in the Paris exchange, "Liberty" in the chamber of deputies, "Phidias" in the Tuileries garden, and statues of saints in several Paris churches.

PRADON, Jean Nicolas, a French poet, born in Rouen in 1632, died in Paris in Jan. 1698. In 1674 he produced his first tragedy, *Pirame et Thisbé,* which attracted so much attention that when in 1677 Racine produced his *Phèdre,* the duchess of Bouillon and her brother the duke of Nevers, who had a pique against the great poet, caused Pradon to write a tragedy on the same subject under the title of *Phèdre et Hippolyte,* and managed to have it performed at the same time in a rival theatre. The duke and duchess, securing a number of seats in both houses, sent crowds to applaud the play of their *protégé,* while they thinned the ranks of the spectators of Racine. This lasted for 6 nights in succession, and Pradon was apparently the more successful of the two. In order to complete his triumph, he wrote a comedy, *Le jugement d'Apollon sur Phèdre,* a weak attempt to ridicule Racine. Every one of his 11 tragedies is below criticism.

PRADT, Dominique Dufour, abbé de, a French political writer, born at Allanches, Auvergne, April 23, 1759, died March 18, 1837. On the breaking out of the revolution, he was vicar-general of the archbishop of Rouen, was elected by the clergy of Normandy deputy to the states-general, sided with the royalists in the constituent assembly, and in 1791 fled to Hamburg, where in 1798 he published a pamphlet entitled *L'antidote au congrès de Rastadt, ou plan d'un nouvel équilibre Européen.* In another tract, *La Prusse et sa neutralité*

(1800), he urged a coalition of Europe against the French republic. He returned to France in 1801, when his *Trois âges des colonies* (3 vols. 8vo.) appeared. Through the means of his relative Gen. Duroc, he was appointed almoner to the emperor, received the title of baron, and became bishop of Poitiers. In 1808 he accompanied Napoleon to Bayonne, was instrumental in bringing about the abdication of Charles IV. of Spain, and was rewarded by a handsome gratuity and the archbishopric of Mechlin. In 1812 he was appointed minister to the grand duchy of Warsaw; but having failed to fulfil the intentions of the emperor, he was disgraced, deprived of his office of grand almoner, and sent to his diocese. De Pradt even represents Napoleon as saying that but for him he would have made the conquest of the world. On the invasion of France by the combined armies of Europe, he hastened to Paris to join the royalists, and after the battle of Waterloo published his *Histoire de l'ambassade dans le grand duché de Varsovie en* 1812, in which he violently denounced the conduct of the ex-emperor, and which passed through 9 consecutive editions. His zeal for the Bourbons however was received with coolness, and having been obliged to resign his archbishopric, in which he had not been confirmed by the pope, he retired to his estate in Auvergne, and published a number of political works of no permanent importance. In 1827 he was elected to the chamber of deputies by the department of Puy-de-Dôme, but resigned in 1828, and spent the rest of his life in obscurity.

PRAED, Winthrop Mackworth, an English poet, born in London in 1802, died July 15, 1839. He was the son of a prominent lawyer, and was early sent to Eton, where he was joint editor of the "Etonian," a school magazine, in 1820. At Trinity college, Cambridge, he obtained an unprecedented number of prizes for Greek odes and epigrams, and for English poems. During his residence at Cambridge, Charles Knight, the publisher, commenced a magazine of which 3 volumes were published, written by a little clique of poets and essayists, conspicuous among whom were Praed and Thomas Babington Macaulay, then rival leaders in the Cambridge debating society. Praed was graduated in 1825, and called to the bar in 1829. In 1830 and 1831 he was returned to parliament for St. Germain in Cornwall, and soon took a prominent place among the younger conservative members. In 1834 he was appointed secretary of the board of control, and in 1835 he was returned for Great Yarmouth. He was afterward member for Aylesbury, recorder of Barnstaple, and deputy high steward for the university of Cambridge. In 1838 his failing health compelled him to resign his appointments. An edition of his poems was published in New York by R. W. Griswold, and an enlarged one in 2 vols. appeared in 1859. No complete collection of his writings has ever been made.

PRÆNESTE (now *Palestrina*), an ancient city of Latium, situated on a spur of the Apennines, 23 m. E. S. E. from Rome. It was probably older than Rome, although it is first mentioned in history in the list of cities of the Latin league given by Dionysius. Its great power, arising partly from its almost impregnable position, rendered it a place of importance in the early wars of Italy. Originally opposed to Rome, it formed an alliance with that republic in 499 B. C., but a century later became engaged in a war with it. In [illegible] its inhabitants marched to the very gates of Rome, and were routed with great slaughter on the banks of the Allia by T. Quintius Cincinnatus, who, following up his advantage, took 8 towns subject to Præneste, and compelled the city to submit. In 340 Præneste was a conspicuous member of the Latin league against Rome; but the defeat of the combined forces by L. Camillus at Pedum in 338 put an end to the war, and by the terms of the peace which followed the city was deprived of a part of its territory. At the end of the social war the inhabitants received the Roman franchise. During the civil war between Marius and Sulla it was one of the chief places in the hands of the Marian party, and the place of refuge of the younger Marius after his defeat. Sulla captured it after several attempts to bring it relief had failed, massacred the inhabitants, demolished its fortifications, and planted a military colony on its territory. Although not destroyed, Præneste seems never to have recovered from this blow. It became during the existence of the empire a place of summer resort for the Romans, and was also much visited on account of its temple of the goddess Fortune, the seat of a favorite oracle. Its answers were made by the voice of the priestess or by the *sortes Prænestinæ*, characters stamped on dice and drawn from an urn. During the middle ages the place became once more conspicuous as the stronghold of the Colonna family. It was taken by Pope Boniface VIII., who dismantled the fortifications, confiscated the property of the inhabitants, and razed the buildings to the ground. It was rebuilt in 1307, resisted an attack of Rienzi, but in 1436 was captured by Cardinal Vitelleschi, who in 1437 destroyed it. In 1448 it was again rebuilt by the Colonnas. In 1630 it was sold by Francesco Colonna to Carlo Barberini, brother of Urban VIII., for the sum of 775,000 scudi. The modern town of Palestrina is situated principally on the ruins of the temple of Fortune. Among the ruins of the old city many statues and other valuable remains of antiquity have been discovered, and among others the celebrated mosaic, considered the finest of the ancient mosaics now existing. According to Müller it is a natural-historical and ethnographical representation of Egypt.

PRÆTOR (Lat. *præire*, to lead), a Roman officer whose duties were chiefly judicial, and also, according to Cicero, the title given to the nsuls as leaders of the Roman armies. The fice was first created in 366 B. C., when the nsulship was divided between the patricians d plebeians, and it was given to the former as indemnification; it was not held by a ple- ian until 339. It was a kind of third consul- ip, the prætor being called the colleague of consuls, and appointed in the *comitia cen- iata* with the same auspices. When the nsuls were absent from Rome, he exercised ir functions in the city, the senate, and the omitia. He was a curule magistrate, and had e *imperium*, although subject to the consuls, tween whom and himself there was also the fference that he was attended by only 6 lic- rs. Originally the prætor was a consul of e preceding year, and after the admission of ebeians to the office it was filled for some me alternately by the patrician and plebeian nsul of the preceding year. In 246 another gistracy, that of *prætor peregrinus*, was cre- ed with the special duty of deciding dis- tes between foreigners and between citizens d foreigners; and in distinction from him ho filled this office, the other prætor was lled *prætor urbanus*. These two, after elec- n, decided by lot which of the two magis- acies should be filled by each; and if one of em departed from the city at the head of an my, the other discharged his duties. After e extension of the Roman power beyond the nits of Italy and the formation of provinces, ætors were sent to govern them. Thus in 7, Sicily and Sardinia having been subjugat- l, prætors were created for the purpose of gov- ning them; and the same thing happened on e conquest of Spain. Under Sylla the num- r of prætors was raised to 8; under Julius sar successively to 10, to 12, to 14, to 16; der Augustus it varied, but was finally fixed 12; and under Tiberius it rose again to 16. y Claudius two prætors were created for mat- s of *fidei commissa*, but Titus reduced the mber to one; another, however, was created y Nerva with the duty of deciding questions tween the *fiscus* and individuals. At all mes, however, the *prætor urbanus* was the st in position, and was specially spoken of as e prætor. He was the chief magistrate for e administration of justice, and could not be way from Rome for more than 10 days at a me. His duty also was to superintend the di *Apollinares*. He, along with the *prætor regrinus*, had the right of issuing edicts, and ese edicts were one of the sources of Roman w, under the title of *jus honorarium* or *præ- rium*. Under Hadrian these edicts were col- cted and arranged by Salvius Julianus, and titled *edictum perpetuum*; and after the reign that emperor they no longer exercised the ght. They however existed long afterward.

PRÆTORIAN GUARDS. See GUARDS.

PRAGA, a fortified town of Russian Poland, the government of Warsaw, on the right nk of the Vistula, opposite Warsaw, with hich it is connected by a bridge of boats; pop. about 8,000. Here in 1656 the Poles were defeated by Charles Gustavus of Sweden; but the chief interest belonging to the city is connected with the insurrection of 1794. Kosciuszko having been defeated and made prisoner in the battle of Maciejowice, the dispirited and disorganized remnants of the Polish army defended the ramparts of Praga against the victorious Russian forces under Suwaroff. On Nov. 3, 1794, the Russian general ordered an assault, and after a fierce struggle the ramparts were carried, more than 15,000 Polish soldiers being slain, drowned in the Vistula, or taken prisoners, and an almost equal number of unarmed inhabitants of Praga, of every age and sex, brutally massacred. In the evening a great fire arose, which destroyed a large part of the city. After the result Suwaroff wrote from the field of battle to the empress: "Hurrah! Praga! Suwaroff;" and received his promotion in the following answer: "Bravo! field marshal! Catharine."—The vicinity of Praga was the principal seat of the Polish war in 1831.

PRAGMATIC SANCTION (Gr. πρᾶγμα, a deed or act), a state ordinance decreed by the monarch or legislature. The phrase seems to have originated with the Byzantine monarchs, but was early introduced into France, and is now applied to several state decrees which have become historical. I. The ordinance of Louis IX. (St. Louis) in 1260, by which the liberties of the Gallican church were established. II. That of Charles VII. of France, proclaimed at Bourges in 1438, confirming the decrees of the council of Basel, and thereby authorizing the election of bishops by cathedral chapters, &c. It was abandoned by Louis XI., but after his quarrel with the pope it had again the force of law until, in 1516, Francis I. substituted for it his concordat with Leo X. III. The ordinance confirming the decrees of the same council, adopted in Germany in 1439 by the diet of Mentz. It was abandoned in 1448 by the diet in consequence of negotiations with Pope Nicholas V. IV. The instrument by which the Austrian emperor Charles VI., in default of male heirs, endeavored to secure the succession to his heirs of the female line. This ordinance was ratified by the estates of all the kingdoms and principalities of the Austrian empire, and by most of the sovereignties of Europe from 1720. In consequence of this, the archduchess Maria Theresa, wife of Francis of Lorraine, ascended the throne. The attack of Frederic the Great of Prussia on the Austrian province of Silesia, however, was the signal for a violation of the instrument and for a general war throughout Europe. V. The instrument by which Charles III. of Spain, in 1759, settled the right of succession to the throne of the Two Sicilies upon his third son and his descendants.

PRAGUE (Bohem. *Praha*; Germ. *Prag*), the capital of Bohemia, situated on both sides of the river Moldau, 75 m. S. S. E. from Dresden, in lat. 50° 5′ N., long. 14° 25′ E.; pop.

about 145,000. It is overlooked upon all sides by rocky eminences, and surrounded by a wall 12 m. in circumference, which has 8 gates. The city is divided into 5 portions, the Altstadt, Neustadt, Josephstadt, Hradschin, and Kleinseite. On the right or E. bank of the river are the Altstadt, or old town, the principal business quarter; the Neustadt, or new town, which has broad, regular streets, but is inhabited chiefly by the poorer classes; and the Josephstadt, or Judenstadt, the Jews' quarter, a labyrinth of narrow, dirty streets, and low houses. The Jews have magistrates and a town hall of their own, in which they conduct the affairs of their community. On the left bank are the Hradschin, with many edifices of historic interest, and the Kleinseite, which contains the houses of the aristocracy and the ancient Bohemian nobles, with gardens and shrubberies that in many cases extend high up the irregular hills behind. Two bridges span the Moldau within the city, beside the railroad bridge of the Prague and Dresden line. The Carlsbrücke, 1,790 feet long, has 16 arches, and is ornamented on each side with 28 statues of saints. Further up the river is an iron suspension bridge, built in 1841. The most interesting of the public buildings of Prague is the castle of Hradschin, for centuries the residence of the Bohemian kings, and said to contain 440 apartments. It was originally built in 1353 by the emperor Charles IV., but having been destroyed by fire in the 16th century it was rebuilt in the 18th. From a window in this edifice, nearly 80 feet above the ground, two unpopular members of the imperial government were thrown in 1618 by the Bohemian nobles and deputies; this act virtually began the 30 years' war. In the Rathhaus, or town hall, in the Altstadt, portions of which date from 1400, the ancient corporations of Prague held their deliberations and banquets. In the Josephstadt is a Jewish synagogue remarkable for its antiquity, it being believed to be the oldest in Europe. The cathedral, which stands near the Hradschin, finished in 1486, of Gothic architecture, contains the chapel and shrine of St. John Nepomucen, ornamented with about 37 cwt. of silver, and a splendid mausoleum erected by Rudolph II. over the bodies of several Bohemian sovereigns. The Theinkirche in the Altstadt contains the tomb of the astronomer Tycho Brahe. On the highest point of land in Prague stands the Strahow monastery, which has a library of 50,000 volumes. Of the numerous palaces in the Kleinseite, the most remarkable is that of Wallenstein, which, though unfinished, is of immense extent; some apartments with their furniture remain in their original state, and the palace still belongs to a branch of Wallenstein's family. Some of the palaces contain considerable libraries, as the Lobkowitz palace, which has 70,000 volumes, and the Kinsky palace, which has 40,000. The university of Prague was founded in 1348, and at the beginning of the 15th century, it is said, its students numbered 20,000. The original school is now entirely devoted to instruction in medicine, law, and the sciences, and a new one is established for education in theology. Prague has manufactories of printed cotton, linen, silk, and woollen fabrics, jewelry, mathematical and musical instruments, paper, leather, hats, liqueurs, earthenware, &c. Several annual fairs are held.—The date of the origin of Prague is not known, but a portion of it was probably built in the 8th century. It has suffered greatly from the ravages of war, particularly during the Hussite contests. It witnessed the first outbreak of the 30 years' war in 1618, and in 1620 the battle which ruined the fortunes of the elector Frederic was fought near its walls at the foot of the White mountain. In 1631 the city was taken by the elector of Saxony, and the next year was retaken by the imperialists under Wallenstein. The Swedes gained possession of the Kleinseite in 1648, but evacuated it in the same year upon the conclusion of the peace of Westphalia. Prague was taken by the French and Bavarians in 1741. In 1744 it was reduced by Frederic the Great after a severe bombardment, but restored by the peace of Dresden in the next year. The same monarch defeated the Austrians before the city in 1757. In 1848 Prague was the seat of the Slavic congress, and the scene of a national Bohemian outbreak in June, when a desperate contest took place. Windischgrätz, however, gained possession of the Hradschin, and thence bombarded the rest of the city, and by the 19th of June the insurrection was entirely put down.

PRAIRIE. See PLAINS.

PRAIRIE, a central co. of Ark., bounded E. by White river and N. by Cypress bayou, one of its branches, and by bayous Metoe and Des Arc; area, 1,050 sq. m.; pop. in 1860, 8,854, of whom 2,839 were slaves. It has a nearly level surface covered by prairies and forests. The productions in 1854 were 134,295 bushels of Indian corn, 1,455 of oats, and 1,434 bales of cotton. Capital, Brownsville.

PRAIRIE DOG (*cynomys*, Raf.), a genus of American rodents, intermediate between the marmots and the spermophiles or prairie squirrels. The cheek pouches are very rudimentary; the eyes large, and the ears very short; 5 distinct claws on all the feet, those on the fore feet much the largest; the body thick and low, the feet large, and the tail short and thinly haired; the skull short and very broad, with the zygomata strongly convergent anteriorly; molars very large, arranged in curves, strongly divergent anteriorly, and near together behind. The common prairie dog (*C. Ludovicianus*, Ord) is about 13 inches long, with the tail 4 more; the color above is reddish or cinnamon brown, with lighter tips to the hairs and a few black ones intermixed; beneath, brownish white or yellow; tail like the back, with a black tip; in winter the color above is more grayish; the hind soles have a hairy patch. This woodchuck in miniature is abundant on the plains west of the Missouri river, extending as far north as the limits of the United States, and south to lat. 30° N.; it is confined to the prairies, and feeds on plants and occasionally on insects. Prairie dogs live in society, hundreds in the same district, their numerous burrows placed close together, and sometimes extending over a space of miles, meriting the common name of dog towns or villages; around the mouth of the burrows the earth is heaped up to a height of about 18 inches, from the top of which the occupants delight to survey what is going on in the community; their burrows are so deep and extensive, that riding among them is often dangerous to horses' limbs; fond of standing erect at the mouth of their burrow, and rarely going a great distance from it, they retreat in a comical tumbling manner at the least sign of danger, after a short time peeping out, squirrel-like, to ascertain the cause of alarm. They feed chiefly at night, are very shy, and when shot, unless killed outright, almost always manage to get into their holes; they are active, playful, very prolific, and from their habitat as yet not injurious to vegetation; their flesh is tender, fat, and juicy. In the northern districts they hibernate during winter. The prairie dog was probably so named from the sharp tone of its chatter, somewhat resembling the yelp of a small dog, as it bears no resemblance to the dog in external appearance; it is the *petit chien* of the French Canadians and the *wishtonwish* of the western Indians. Burrowing owls and rattlesnakes occupy the burrows with the prairie dogs, both doubtless feeding on the young rodents and occasionally on the half-grown animals; it is probable that they could not master the adults. In regard to the snakes, Mr. Kendall, in his narrative of the Santa Fé expedition, says that the prairie dogs are "compelled to let them pass in and out without molestation—a nuisance, like many in more elevated society, that cannot be got rid of." A smaller species, with a shorter tail, is found on the plains near the Columbia river; this, the *C. Columbianus* (Ord), is of a reddish color above, with the tail edged and tipped with white.

PRAIRIE DU CHIEN, a village and the capital of Crawford co., Wis., on the Mississippi river, 4 m. above the mouth of the Wisconsin; pop. in 1860, 3,000. It is situated on a prairie 9 m. long and 2 m. wide, bordered on the E. by rocky bluffs. There are a number of ancient mounds in the village, and in the vicinity are rich copper mines. It contains 4 churches (Methodist, Congregational, Episcopal, and Roman Catholic), and an academy directed by Dominican nuns. It is the terminus of the Milwaukee and Prairie du Chien railroad, 192 m. in length, and has steamboat communication with St. Paul's and other ports of the Mississippi. Prairie du Chien is one of the oldest towns in the West, having been settled by the French about 1740.

PRAIRIE HEN. See GROUSE, vol. viii. p. 519.

PRAIRIE SQUIRREL, the common name of the North American rodents of the genus *spermophilus* (Cuv.), most of them coming under Brandt's sub-genus *otospermophilus*; they belong to the marmot family, and seem to connect these with the ground squirrels. The ears are moderate but generally distinct, the tail long and squirrel-like, and the cheek pouches well developed; the soles behind the toes are hairy in winter, naked in summer; the claw of the thumb is very small, or is replaced by a flat nail; the body more slender than in the marmot or woodchuck. These animals take the place of the tree squirrels in the West, and are fitted for terrestrial life on the grassy prairies, feeding on the roots and seeds of prairie plants; the body is rather thick-set, and the legs and toes short, with straight nails for digging; they pass the winter in a torpid state in the cold regions, carefully stopping up the mouths of their holes; they are diurnal and gregarious, though to a less extent than the prairie dogs. The California prairie squirrel (*S. Beecheyi*, F. Cuv.) is about 11 inches long, with a tail about 8; the general color above is an indistinct mottling of black, yellowish brown, and brown; below pale yellow; a broad hoary white patch on the sides of neck and shoulders, extending back a short distance on the sides; ears acute and prominent, black on the inside; tail flattened and well covered with hairs; body slender, and the head acute, with long whiskers; fur short, thin, and coarse. This species causes much damage to the farmer in the fields of grain and the vegetable garden, and by disturbing the soil in their excavations. The gray prairie squirrel or gopher (*S. Franklini*, F. Cuv.) is mottled yellowish gray and brown, with a gray head; the length is 9 inches; it inhabits the western states, sometimes annoying the farmer by digging up his newly planted corn and eating the grain as it fills; it is fond of burrowing under drains and ditches. The best known species is the striped prairie squirrel (*S. tridecem-lineatus*, Aud. and Bach.), 6 inches long, with a tail of 4; the color is dark brown above, with 9 stripes of this color alternating with 8 of a yellowish gray (17 in all, the lower ones not always distinct), the 5 central ones of the former with yellowish dots and spots; lower parts and tail brownish yellow, the latter margined and tipped with blackish. It is found abundantly on the western prairies, above lat. 40° N. In Iowa, Wisconsin, Minnesota, and northern Illinois, it is commonly called gopher; for the true animal of this name (*geomys bursarius*, Rich.), see GOPHER. It is not found in heavy timber lands, but sometimes in oak openings, and generally on the prairies; its burrows are so shallow that a few pailfuls of water will commonly drown it out. The food consists of grasses, roots, seeds, insects, and field mice; though it is sometimes destructive in newly cultivated districts or in neglected fields, to an extent which may require a second planting, it probably more than makes up the loss by the destruction of mice and noxious insects; it disappears before the plough, and rarely attacks old and well cultivated fields; it brings forth 6 or 7 young, once a year, in May or June. Its southern representative is the *S. Mexicanus* (Wagn.).

PRAIRIE WOLF. See WOLF.

PRAM, CHRISTIAN HENRIKSEN, a Danish poet, born in Guldbrandsdalen, Sept. 4, 1756, died in the island of St. Thomas, Nov. 25, 1821. He was educated at the university of Copenhagen, and in 1781 was appointed to a situation in the chamber of commerce. About the same time he founded the *Handelstidende* or "Journal of Commerce," with which he was connected for 5 years. He originated the "Minerva," a literary periodical, and in conjunction with some friends established the Scandinavian literary society, of which he was president for a number of years. He held an official appointment in St. Thomas at the time of his death. His principal works are the *Stær-Kodder*, a poem in 15 cantos upon the old Scandinavian legends; and the tragedies "Damon and Pythias" and "Frode and Fingal." A collection of his miscellaneous works was published by Rahbek in 1824–'6, in 4 vols.

PRASLIN, a French marquisate, deriving its name from a village of Champagne, near Bar-sur-Seine, department of Aube, which was in possession of the main branch of the house of Choiseul, but in 1690 came into that of the counts of Chevigny, another branch of the same house, and in 1762 was made a dukedom. I. CÉSAR GABRIEL DE CHOISEUL, duke of Praslin, born in Paris in 1712, died in 1785, succeeded his cousin, the celebrated duke de Choiseul, as ambassador at Vienna, and in 1763 signed the treaty which put an end to the 7 years' war. He was afterward successively minister of foreign affairs and of marine, imparting great energy to naval affairs, and shared his cousin's disgrace in 1770. II. ANTOINE CÉSAR FÉLIX, grandson of the preceding, born in 1776, died in Paris, June 28, 1839, a zealous follower of Napoleon, and chamberlain to the empress Maria Louisa, was made peer during the Hundred Days, struck off the list after the restoration, and reinstated in 1817. III. CHARLES LAURE HUGUES THÉOBALD, son of the preceding, born in 1786, died Aug. 28, 1847. He married in 1825 the daughter of Marshal Sebastiani, who brought with her a large dowry, and bore him 10 children. On Aug. 18, 1847, she was found murdered in her house in the faubourg St. Honoré in Paris. Suspicion fell upon her husband, who had been for several years estranged and partially separated from his wife; he was carried to prison, and there died from taking poison. His guilt was placed beyond all doubt. —The present duke and head of the family is GASTON LOUIS PHILIPPE, born Aug. 7, 1834.

PRATI, GIOVANNI, an Italian poet, born at Dascindo, in the Tyrolese Alps, Jan. 27, 1815. The success of his first poem, *Edmengarda* (Milan, 1841), induced him to relinquish the study of law in which he was then engaged, and devote his time to literature. Having produced several volumes of poems, he published in 184[illegible] a volume entitled "Political Songs," among which the "Hymn to Italy" and the "Song of the Future" became famous in Italy.

PRATINCOLE (*glareola*, Briss.), a genus of wading birds of the plover family, inhabiting the temperate and warmer regions of the old world. About half a dozen species are described in Europe, Asia, Africa, and Australia, frequenting the borders of rivers, lakes, and marshes, in low and in high regions; the food consists of worms and insects, which they pick from the ground or aquatic plants, or take on the wing like swallows; they fly and run very swiftly; the nest is a slight structure on the ground among the thick herbage of the marshes, and the eggs 3 or 4 in number. The collared pratincole (*G. pratincola*, Pall.) is about the size of a blackbird, 9 inches long; it is brown above, white on the rump and below; the throat surrounded by a black circle; the base of the bill and the feet reddish. It is plentiful in Austria, and has received one of its specific names (*Austriaca*) from that country; it is occasionally found in England, and is extensively distributed over the old world; it is usually seen in flocks, which are very noisy; the food consists chiefly of beetles and grasshoppers. It so resembles the swallows in its forked tail and flight, that it was at first placed among them by Linnæus; from its appearance and habits on the ground it is called sea partridge by the French, though rarely found near the coast. The cream-colored pratincole (*G. lactea*, Temm.) is a smaller species, living on the banks of the Ganges; its color above and on the wings is cinereous white, below white; quills and under wing coverts black; tail feathers, except the outer ones, with a black spot. The Australian pratincole (*G. Isabella*, Vieill.) has the breast and upper parts light rufous; throat and upper tail coverts white; abdomen bright chestnut; quills and under wing coverts black; it has a stouter bill and longer legs than the other species, and approaches the coursers (*cursorius*, Lath.).

PRATT, CHARLES. See CAMDEN, EARL.

PRAWN, a marine decapod crustacean, of the macrourous division and genus *palæmon* (Fabr.). About 20 species are described, mostly of small size, though some from tropical regions are a foot long; they somewhat resemble the crawfishes in appearance, habits, and movements. The carapace is broad, prolonged anteriorly into an acute, laterally flattened rostrum, with 8 or 9 teeth above and 3 or 4 below, usually extending beyond the peduncles of the antennæ; the eyes large and prominent; the 1st and 2d pairs of feet terminate in 2-fingered claws, the 2d pair the largest and longest; carpus inarticulate; external jaw-feet short and slender; external antennæ very long, with a scale at the base, and sometimes with 3 threads; 5 pairs of fin-like fringed feet under the tail; the principal swimming organs in forward locomotion; tail ending in movable leaflets as in the lobster, by which the animal darts rapidly backward when alarmed. The best known, most common, and most esteemed as food, is the serrated prawn (*P. serratus*, Leach), found on the coasts of England and France, in rocky situations, and in still, clear water, living among the floating sea weeds; it is about 4 inches long, of a bright gray color, spotted and lined with darker purplish gray; it turns red by boiling. It is taken in traps resembling lobster pots, but of smaller size and closer meshes, and in bag nets. The flesh is tender, sweet, nutritious, and easily digested; it is generally cooked in vinegar and salt; on account of the thinness of the shell the whole animal is eaten; large numbers are consumed, and the London market is supplied principally from the isle of Wight and the Hampshire coast; the females in spring, when with eggs, are most highly esteemed; they are also used as bait; they must be cooked very soon, as the flesh decomposes quickly, and with an almost insupportable odor. Very many are devoured by fishes, but their numbers are kept undiminished by their remarkable fecundity. They are rapid swimmers when alarmed. There are other species in the Mediterranean, the largest of which are salted, and are consumed by the Greeks and Armenians during Lent, with the allied genus *penæus* (Fabr.). The American prawn (*P. vulgaris*, Say) is much like the *P. squilla* (Fabr.) of Europe; it is a little larger than the shrimp, about 1½ inches long, and may be known by the large, upturned, toothed rostrum; the fingers of the 2d pair of feet are shorter than the hand. Larger species are the *P. forceps* (M. Edw.), from Rio Janeiro, 5 inches long; *P. ornatus* (Oliv.), from the Indian archipelago, 6 inches; *P. Jamaicensis* (Oliv.), from the West Indies, 10 to 12 inches; and *P. carcinus* (Fabr.), from the Indian seas, about a foot.

PRAXITELES, a Greek sculptor, who lived in the latter half of the 4th century B. C. Nothing is known of his personal history, except that he was a resident of Athens. He ranks at the head of the later Attic school. Without any attempt at the sublime impersonations of deity by which Phidias had become famous, he was unsurpassed in the exhibition of the softer beauties of the human form. In the Cnidian Venus, his most celebrated work, of Parian marble, modelled from the courtesan Phryne, he expressed perfectly the idea of sensual charms. The position of the left hand was the same as in the Venus de' Medici; the right hand held some drapery which fell over a vase beside the statue, and was intended to indicate that she had just left the bath. Pliny recounts that Praxiteles made two statues of Venus, the one draped, the other naked, and that he thought them of equal value, and offered them for the same price; that the people of Cos bought the draped one, the people of Cnidus the other; and that this latter totally eclipsed the fame of the draped statue. So highly did the Cnidians themselves esteem it, that when King Nicomedes offered them as the price of it to pay off the whole of their heavy public debt, they preferred not to part with a work which gave their city its chief renown. The statue was afterward taken to Constantinople, where it perished by fire in the reign of Justinian. Praxiteles also made two marble statues of Eros. It is said that in his fondness for Phryne, the artist had promised to give her whichever of his works she chose, but would not tell her which of them he thought the best. To discover this she sent a slave to tell him that a fire had broken out in his house, and that his works would perish, whereupon he cried out that all his toil was lost if the fire had touched his satyr or his Eros. The words were reported to Phryne, who chose the Eros, and dedicated it at Thespiæ. It was of Pentelic marble, with the wings gilt, and represented the god in the flower of youth. The satyr is said to have stood alone in the street of the tripods at Athens, and it is supposed that several marble statues, which represent a satyr leaning against the trunk of a tree, are copies of it. The best specimen of these is in the Capitoline museum at Rome. The marble statues of Praxiteles are thought to have been covered with a thin encaustic varnish of flesh color.

PREBEND (Lat. *præbenda*), in the church of England, a sum set apart from the revenue of a cathedral church for the support of a clergyman called a prebendary, on the condition of his officiating occasionally therein. By the act 3 and 4 Victoria, all prebendaries are henceforth styled canons, "honorary," who have no emolument, and "resident," who receive a stipend, and the number attached to each cathedral is defined.

PREBLE, a S. W. co. of Ohio, bordering on Ind., and drained by Franklin, Four Mile, and St. Clair creeks, tributaries of the Great Miami; area, 432 sq. m.; pop. in 1860, 21,820. It has a nearly level surface and very fertile soil. The productions in 1850 were 1,175,391 bushels of Indian corn, 238,435 of wheat, 181,926 of oats, 10,221 tons of hay, and 72,121 lbs. of wool. There were 18 grist mills, 24 saw mills, 4 woollen factories, 8 tanneries, 2 newspapers, 51 churches, and 5,120 pupils attending public schools. It is intersected by the Dayton and western, and the Cincinnati, Eaton, and Richmond railroads. Capital, Eaton.

PREBLE, EDWARD, an officer of the U. S. navy, born at Falmouth neck, the site of the present city of Portland, Me., Aug. 15, 1761, died in Portland, Aug. 25, 1807. His father, Jedidiah Preble, served under Wolfe, was wounded at the capture of Quebec, subsequently held a commission as brigadier-general from the provincial congress of Massachusetts, and was a representative and senator in congress (1780) and judge of the court of common pleas. Edward entered the provincial marine of Massachusetts as a midshipman in 1779, was in the action between the Protector, 26 guns, and the English privateer General Duff, which blew up after a severe combat, was afterward captured off the Penobscot, and became a prisoner on board the prison ship Jersey in the harbor of New York. On being liberated he joined the Massachusetts vessel of war Winthrop, Captain George Little, and distinguished himself by boarding, with 14 men, an English armed brig lying at anchor off Castine, and carrying her out under fire of an English battery. He received the commission of lieutenant in the U. S. navy in 1799, and took command of the Pickering, one of Commodore John Barry's squadron stationed among the Windward islands. At the close of 1799 he was promoted to be captain, the intermediate rank of master commandant being passed over, and appointed to command the Essex, 32, in which he went out to Batavia, and convoyed home a fleet of 14 merchant vessels. Owing to ill health he remained unemployed until 1803, when he received command of the squadron sent against Tripoli. His flagship was the Constitution, 44; and the other vessels of the squadron were the Philadelphia, 38, Capt. Bainbridge; Argus, 16, Lieut. Decatur; Siren, 16, Lieut. Charles Stewart; Enterprise, 12, Lieut. Isaac Hull; Nautilus, 12, Lieut. Richard Somers; and Vixen, 12, Lieut. John Smith. The attention of Preble was first directed toward Morocco, and anchoring at Tangiers with a part of his squadron in Oct. 1803, he opened negotiations by which he finally placed our relations with that power on a friendly footing. On Nov. 12 he gave formal notice of the blockade of Tripoli, off which port he supposed the Philadelphia, the Vixen, and other small vessels then to be. On the 27th he arrived at Malta, where he received letters from Capt. Bainbridge apprising him of the capture of the Philadelphia. At the suggestion of Bainbridge, with whom he kept up a correspondence, the Philadelphia was destroyed at her anchorage in the harbor by Lieut. Decatur (see Decatur, Stephen), Feb. 10, 1804. On July 25 Preble was before Tripoli with 15 sail, including 2 bomb vessels armed each with a 13-inch mortar, and 6 gun boats of 25 tons, built for harbor service, and carrying each a 24-pounder. These gun boats and bomb vessels were borrowed of the Neapolitan government. The first attack was made on Aug. 3 upon the enemy's gun boats, which were anchored in 3 divisions, two of them outside and one inside a line of rocks which forms the harbor, the whole being protected by batteries on shore. About 1 o'clock P. M. Preble stood for the town in the Constitution, his gun boats following in two divisions under Decatur and Somers. As they neared the harbor the Constitution shortened sail and opened a destructive fire upon the batteries, while the gun boats closed with the Tripolitans, carried 3 of the largest by boarding, and sunk 3 others. After a desperate hand-to-hand conflict of more than 3 hours, the smaller vessels of the American squadron took the gun boats, bomb vessels, and prizes in tow, and hauled off under cover of the Constitution's fire. The American loss was but 14 killed and wounded. On the 8th another attack was made, but with less success, as the Tripolitans kept close within the harbor. One of Preble's gun boats was sunk. Another general attack was made on the 28th, when about 3 o'clock A. M. the gun boats, covered by the brigs and schooners and accompanied by all the boats of the squadron, anchored with springs on their cables close to the rocks at the entrance to the harbor. They were in two divisions as before, and as soon as they anchored commenced a fire. As day dawned the Constitution stood in under a heavy fire, and at this time 13 Tripolitan gun boats and galleys were closely engaged with the 8 American boats. As the ammunition of the latter was nearly exhausted, Com. Preble ordered them to retire, and as his frigate came up opened a fire upon the Tripolitan boats, by which one was sunk and two were driven ashore; the rest retreated. The Constitution lay three quarters of an hour within musket shot of the mole, pouring a heavy and destructive fire upon the town batteries, until Com. Preble, finding that all his small vessels were out of gun shot, hauled off. The American vessels were much cut up aloft, but otherwise sustained little injury. A boat of the John Adams (which had joined the squadron on the 8th) was sunk by a shot which killed 3 men. A heavy shot from one of the American gun boats passed through a room in the castle in which Capt. Bainbridge was confined. He was in bed at the moment, and the shot rebounding from the opposite wall fell upon his bed within 6 inches of him. On Sept. 3, a 4th attack was made. The Tripolitans had in the mean time raised and added to their flotilla their boats which had been sunk on Aug. 3 and 28. They also very judiciously changed their mode of fighting, by keeping their boats under way while in action. On this occasion the bomb vessels were directed to throw shells, while the gun boats in two divisions, commanded as before by Decatur and Somers, and covered by the brigs and schooners, attacked the Tripolitan flotilla. Com. Preble brought to in the Constitution very near the rocks, in a position where 70 heavy guns bore upon his ship. Here she opened a very heavy fire, silencing the enemy's batteries in succession. The ship suffered very much, as was to be expected, for she was exposed to more than double her number of guns, generally of heavier caliber, and protected by stone walls. After throwing more than 300 round shot, she hauled off, having by signal previously directed the other vessels to do so. By this time preparations for another species of annoyance, which Com. Preble had meditated for some time, were completed. The Intrepid, a ketch, captured from the enemy, and which Lieut. Decatur had used in destroying the Philadelphia, was converted into a fire ship. In a mall magazine prepared for the purpose 100 barrels of gunpowder in bulk were placed, and on the deck immediately above it were deposited 150 shells, with a large quantity of shot, &c., and a proper train was laid. Capt. Somers commanded the expedition, and Lieut. Wadsworth of the Constitution was second in command, both volunteers. The night of Sept. was selected for the attempt, and the Intrepid stood in, accompanied by several small vessels, which hove to at different stations to pick up the retreating boats. Two of the fastest boats of the squadron, manned by volunteers from the Constitution and Nautilus, had been selected to bring the party off. The wind was light, the night dark and hazy, and the sea perfectly smooth. The Intrepid when last seen was not a musket shot from the mole, and seemed to be still standing in. About this time the batteries opened, and after a few moments of suspense a light like that of a volcano illuminated the harbor, which was followed by a concussion that shook even the vessels in the offing. The transient light of the explosion enabled the fleet to see that the Intrepid had not reached the point at which she aimed. It was now that the return of the adventurers was looked for with the most intense anxiety, but they never reappeared. The vessels on this duty remained off the harbor until the sun rose, but, with the exception of a few fragments here and there upon the rocks, nothing of the Intrepid could be seen. One of the Tripolitan gun boats was missing, and some other damage was supposed to have been done, but on the whole a serious loss was sustained by the Americans without any commensurate damage to the enemy. It was subsequently known, through Capt. Bainbridge, that the bottom of the ketch grounded near the mole, and that some mangled bodies, which could not be identified, were picked up. On Sept. 8 Com. Samuel Barron arrived off Tripoli in the President, 44, with the Constellation, 38, and relieved Com. Preble, who soon after sailed in the John Adams for the United States, where he arrived Feb. 26, 1805. His services were fully appreciated by the country. He received a gold medal from congress, the thanks of which were also bestowed upon him and all the officers and men under his command. A marble monument, executed in Italy, was erected by the officers of the navy in 1806 to the memory of the officers who fell at Tripoli, in the navy yard at Washington, and was afterward transferred to the grounds of the naval school at Annapolis. The health of Com. Preble declined after his return. In 1806 President Jefferson desired to place him at the head of the navy department, but the state of his health did not permit him to accept the position. He was an officer of the highest professional character and conduct, and his influence upon the discipline of the service was lasting and valuable.

PRECESSION OF THE EQUINOXES, a slow regression of the equinoctial points upon the plane of the ecliptic. It is so called from its causing the sun to arrive in either equinox a little earlier than he otherwise would. The effect is to increase the longitudes of the fixed stars at the rate of about 50¼" annually. The discovery of the movement is due to Hipparchus, about 150 B. C. Copernicus was the first to give a true explanation of the phenomenon. Newton discovered its physical cause. This cause is the attraction of the sun, moon, and planets upon the spheroidal figure of the earth, giving to the axis a gyratory or conical motion well represented by the waving or nodding of a top in spinning. The pole of the equator is thus made to shift its place, performing a complete revolution around the pole of the ecliptic in 25,868 years. The value of precession is erroneously given by Ptolemy. The Arabian astronomers reached a result much nearer the true value.

PREËMPTION. See OCCUPANCY.

PREGNANCY. See MEDICAL JURISPRUDENCE, and OBSTETRICS.

PREMONSTRATENSIANS, a religious order in the Roman Catholic church, founded in the diocese of Laon, France, in 1120, by St. Norbert, a canon regular from Xanten, Germany, who afterward (1127) became archbishop of Magdeburg, died in 1134, and was canonized in 1584. On a meadow situated in the forest of Coucy, and pointed out to him, as he believed, from heaven (whence the name of the order, *pré montré*, "the meadow pointed out"), Norbert gathered his first disciples, and gave them the strict rule of St. Augustine. They were at first a congregation of regular canons, and as such were confirmed in 1126 by Pope Honorius II.; but gradually they assumed all the distinctive peculiarities of a monastic community. The order spread with great rapidity; in France it gained great popularity through its efforts for the suppression of the Albigenses, and in Germany it accumulated immense riches, and several of the abbots were raised to the rank of princes of the empire. The abbot of the parent convent of Prémontré, near Coucy, had the title of general, and he formed with three other French abbots the supreme council of the order. From time to time he called together the superiors of all the houses for a general chapter. A female branch of the order was established simultaneously with that of monks, and, as in several other orders founded at that time, the female convents were at first contiguous to those of the monks, and only separated from them by a wall. Later, however, this arrangement was given up. At the time of the reformation the order had about 2,000 convents, of which about 500 were for women. As the great majority of the convents were in England, Scotland, Ireland, Germany, Denmark, Sweden, and Norway, the order suffered great losses in consequence of the success of the reformation. The strictness of the primitive rule having been abandoned, reformed congregations "of the strict obserance" were established in Spain (1578) and in France, which remained however in connection with the other convents, and the union was strengthened by new statutes in 1630. In the 18th century the number of convents greatly decreased, and the female branch became almost entirely extinct. In 1860 the order had 8 convents in Germany (that at Prague being now regarded as the chief convent of the order), 11 in Hungary, 2 in France, 4 in Belgium and Holland, 1 in the United States (at Sac Prairie, Wisconsin), and 1 in Cape Colony, South Africa. The female branch, in the same year, numbered 5 convents in Poland, Switzerland, and Holland.

PRENTICE, George Denison, an American editor, born in Preston, Conn., Dec. 18, 1802. He was educated at Brown university, Providence, R. I., where he was graduated in 1823. He studied law, but did not engage in the practice of the profession, and in 1828 became editor of the "New England Weekly Review" at Hartford, a literary journal, which he conducted for two years. At the end of that time he removed to Louisville, Ky., where in 1831 he became editor of the "Louisville Journal," a position which he still holds, and in which he has won a high and wide-spread reputation for political ability and for wit and satire. For many years the "Journal" was a leading advocate in the West of the policy of the whig party, and at present (June, 1861) maintains with great zeal and ability the cause of the Union against the secessionists. In early life Mr. Prentice wrote several poems, which are to be found in the collections of American poetry, but have not yet been gathered into a volume. A selection has been published from his newspaper paragraphs under the title of "Prenticeana" (New York, 1860).

PRENTISS, Seargent Smith, an American orator, born in Portland, Me., Sept. 30, 1808, died in Natchez, Miss., July 1, 1850. He was the son of a prosperous shipmaster, who during the war of 1812 retired to a farm in the town of Gorham. The son by a violent fever in infancy was deprived for several years of the use of his limbs, and it was not till the age of 10 or 12 that he was able to walk, and then only with a lameness which continued through life. He entered Bowdoin college in the junior class, and was graduated in 1826. He immediately commenced the study of law in the office of Judge Pierce of Gorham; but in the following year, impelled by the wish to seek his fortune in the West, he went to Cincinnati, in which city he remained a few months, and thence proceeded to Natchez, where he supported himself as tutor in a private family while he pursued his legal studies. He was admitted to the bar in 1829, and began practice at Natchez in partnership with Gen. Felix Huston. In 1832 he removed to Vicksburg, where he soon attained a high reputation as an advocate. He was elected in 1835 to the state legislature. In 1837, at the regular November election, he was chosen a representative in congress, but on arriving at Washington found his seat claimed by a member chosen at a special election held in the preceding July for the extra session of congress called in that year by the president's proclamation. In the closely balanced state of parties at that time in the house, a single vote was of great importance, and that fact and the principles involved in the case rendered the "Mississippi election contest" one of unusual interest. The question attracted universal attention in the country. In a speech continued for 3 days Mr. Prentiss argued his claim before the house with an ability and eloquence that gave him at once the highest reputation as a congressional orator. By the casting vote of the speaker the house decided against his admission, and referred the matter back to the people, who at an election in the following April sanctioned his claim by a triumphant majority; and on returning to Washington he took his seat avowedly under the election of November. He took little part in the business or debates of the house, but maintained his reputation as an orator by a speech against the sub-treasury bill. At the end of his term he declined a reëlection, and devoted himself thenceforth to his profession, rarely taking part in politics. In 1840, however, as a whig candidate for presidential elector, he made an active canvass of the state in behalf of Gen. Harrison. He strongly opposed repudiation, and in 1845, partly in dissatisfaction with the course adopted by Mississippi, he removed to New Orleans, where he passed the remainder of his life, going to Natchez in his last illness. Though only 41 years old at the time of his death, Mr. Prentiss already ranked among the most eminent of American orators. "He was distinguished," says Henry Clay in a letter relating to his death, "by a rich, chaste, and boundless imagination, the exhaustless resources of which, in beautiful language and happy illustrations, he brought to the aid of a logical power which he wielded to a very great extent. His voice was fine, softened and I think improved by a slight lisp, which an attentive observer could discern." Mr. Crittenden in a similar letter says: "It was impossible to know him without feeling for him admiration and love. His genius, so rich and rare; his heart, so warm, generous, and magnanimous; and his manner, so graceful and so genial, could not fail to impress these sentiments on all who approached him. Eloquence was part of his nature, and over his private conversations as well as his public speeches, it scattered its sparkling jewels with more than royal profusion."—A "Memoir of S. S. Prentiss" has been edited by his brother (2 vols., New York, 1855).

PREPOSITION (Lat. *præpositum*, placed before), a word expressing a relation between different words, and placed generally before a noun, which in English it governs in the objective case. According to Horne Tooke, all repositions were originally either verbs or ouns. Grammarians generally class them ith relational words, or those which serve nly to denote the bearing of one thing to nother, as "the son of John," and notional ords, which in themselves express ideas. ome of the Greek grammarians enumerated repositions with conjunctions under the comon name of *σύνδεσμος*, or "connective." In reek there are 18 prepositions, in Latin about 0, and in English about 40, not including a umber of particles called inseparable prepoitions, because they are never found singly, s in be-stir, be-speak, &c.

PRESBURG (Hung. *Pozsony*), capital of the ungarian county of the same name, situated n the left bank of the Danube, and on the esth and Vienna railroad, 35 m. E. from the tter city; pop. in 1857, 43,863. It stands on levated ground, and is of semicircular form, ith the river on the S. side. The Danube is ere about ½ mile wide, and is crossed by a loating bridge. The fortifications have been ismantled, but several towers have been rected for the defence of the place. The royal alace, on a height overlooking the town, is of reat historical interest, but was destroyed uring the bombardment by the French in 809, and is now merely a shell. Among the rincipal buildings are the cathedral, the archishop's palace, the Roman Catholic and Calinist colleges, the city hall, a German theatre, nd various private palatial edifices. The prinipal manufactures consist of cotton, woollen, nd silk goods, leather, oil, and tobacco.—Presurg is a place of great antiquity. It became he capital of Hungary when Buda was taken y the Turks, and remained so till Joseph II. gain made Buda the administrative capital in 784. Presburg, however, continued the legislative capital down to 1848, by the laws of which year the seat of the diet was transferred to Pesth. The Hungarian kings of the house of Hapsburg have all been crowned in Presburg, except Joseph II. and Francis Joseph, who preferred to reign without taking the oath of allegiance to the constitution, which precedes the coronation. The hill on the Danube which the kings after their coronation customarily rode up, brandishing their sword in the direction of the 4 cardinal points as a token of their readiness to defend the country against all enemies, is generally visited by travellers. In 1619 Presburg was captured by Bethlen Gabor, prince of Transylvania, but was recaptured by the imperial troops in 1621. After the battle of Austerlitz, the treaty between France and Austria was concluded at Presburg (Dec. 1805). The city was taken by the French in 1809.

PRESBYTERIANISM (Gr. *πρεσβύτερος*, elder), a system of church government by presbyteries or associations of teaching and ruling elders. In the Presbyterian church, the presbytery is the leading judicatory; the whole care of the flock is committed to ministers or teaching elders and ruling elders; all ministers of the word and sacraments are on an equality; ruling elders, as the representatives of the people, form a part of all ecclesiastical bodies, in which they have equal authority with teaching elders; and a series of judicatories, rising one above another, secures to each church the watch and care of its appropriate judicatory, and to the whole body an efficient system of review and control. Though there may be much diversity in the names of the several judicatories, as well as in the minuter details of arrangement, yet any church embodying the above principles is strictly a Presbyterian church.—Presbyterians believe that the representative system of church government, in opposition to that which is conducted by the entire ecclesiastical population, has its germ in the Old Testament; inasmuch as the people of Israel, at various periods of their history, had "wise and able men" set over them, who were styled elders; and especially as this is well known to have been a distinctive feature of the synagogue system up to the time of the Saviour's advent. And as each particular synagogue was governed by a bench of elders, of which the bishop or "angel of the church" was the presiding officer, so the whole Jewish body was reckoned as one. In cases of alleged erroneous judgment, there were always appeals admitted to the "great synagogue" at Jerusalem, where there was an opportunity of having wrong decisions reversed. The first converts to Christianity being all native Jews, who had been accustomed to the exercise of government by benches of elders, it was natural that they should adopt the representative plan in organizing the primitive church. Accordingly, we read in the New Testament of "elders being ordained in every church;" of an important question being referred to a synod made up of "apostles and elders;" of "elders who ruled well, but did not labor in the word and doctrine;" of the "elders of the church being called for to visit and pray over the sick," &c. So also Presbyterians hold that preaching the gospel, "feeding the sheep and the lambs" of Christ, and administering the Christian sacraments, are the highest offices intrusted to Christian ministers; that a plurality of elders was, by divine direction, ordained in every church; that in no instance in the New Testament do we find an organised congregation under the watch and care of a single officer; that bishop and elder are titles given interchangeably to the same persons, showing that the title of bishop in the apostolic age designated the pastor or overseer of a single flock or church. They hold that there is but one commission given to the authorized ministers of the word and sacraments; that the ordaining power is manifestly represented as possessed and exercised by ordinary pastors, and that ordination is performed by "the laying on of the hands of the presbytery;" that there is not a solitary instance recorded in the New Testament of an ordination being performed by a single individual; that even when deacons were set apart to their office, it is evident from the narrative (Acts vi. 1-6) that a plurality laid hands upon them with fasting and prayer. They moreover believe that the whole visible church, whether in Jerusalem or in Antioch, in Philippi or in Ephesus, was regarded as one body, subject to the same authority, and regulated by the same judicial decisions; in illustration of which they refer to the fact that when a question arose which was of common interest to the whole Christian community, it was decided by a synod of the "apostles and elders at Jerusalem," and the decrees of that synod were sent down to "all the churches" to be registered and obeyed. Passing from the New Testament to the earliest records of uninspired antiquity, Presbyterians assert that the system of ecclesiastical government disclosed by the epistles of Ignatius and Clemens Romanus is thoroughly presbyterian; that this system prevailed for more than 100 years after the apostolic age; that the first inroads which were made upon it were by the pastors of the large towns claiming special preëminence and power as peculiarly the successors of the apostles, and that this claim came gradually to be admitted, and was at last permanently established. They maintain, however, that the admission of this claim was never by any means universal; that the Paulicians in the 7th century, and after them the Waldenses and Albigenses, earnestly protested against all encroachments on presbyterian simplicity; and that when the reformation came, there was a vast preponderance of opinion among the leaders in that enterprise in favor of the presbyterian system; and the reformed churches in France, Germany, Holland, Hungary, Geneva, and Scotland were thoroughly presbyterian, both in principle and practice. Presbyterianism, as it has long existed in these several countries, is substantially the same system, differing only in minor details, and chiefly in the names and arrangements of their several ecclesiastical assemblies. —PRESBYTERIAN CHURCH IN SCOTLAND. The church or kirk of Scotland may be said to have had its remote origin in the first introduction of the principles of the reformation into that country, about 1527. This measure was met by a vigorous opposition on the part both of the sovereign and of the priesthood, while the greater part of the nobility espoused the interests of the people. When Andrew Melville arrived in Scotland from Geneva, in 1574, he found a state of things in many respects favorable to the design of introducing the Presbyterian polity in Scotland; and this he actually effected in 1592. James VI. was intent upon the restoration of episcopacy, even before his accession to the English throne; and after that event he was enabled to accomplish his object. But Charles I., with a view to assimilate in all respects the churches of England and Scotland, determined to introduce a liturgy, which in Scotland had been disused since the reformation, together with a set of canons abolishing the control over ecclesiastical measures which had been conceded to the inferior church judicatories. All this met with a prompt opposition from the multitude, and the clergy were reproached and insulted on every side. The dissatisfied in Scotland, and those who were disaffected toward prelacy in England, entered into a combination binding themselves, by the well known "Solemn League and Covenant" to exterminate prelacy, as being nothing better than a corrupted form of Christianity; and they lent their full influence to the carrying out of those measures which resulted in the death of Charles and the establishment of the commonwealth. Upon the restoration of Charles II., episcopacy was reëstablished in Scotland; but the Presbyterians still resolutely adhered to their principles, and upon the abdication of James II. they confidently anticipated the triumph of their cause. Though William III. was bent on preserving the same form of ecclesiastical government both in England and Scotland, the bishops refused to transfer their allegiance to him, and by this means the way was opened for that establishment of presbytery which had been urged upon him by some of his most zealous adherents, and which was ratified by an act of parliament in 1690. Thus, Scotland and England having been separate kingdoms at the time of the reformation, a difference of circumstances in the two countries ultimately led to different religious establishments; and when the treaty of union was formed in 1707, it was agreed by both kingdoms that episcopacy should continue in England, and Presbyterianism should be the only religious system recognized by the state in Scotland. The only confession of faith legally established before the revolution of 1688, is that which is published in the "History of the Reformation in Scotland," attributed to John Knox. It consists of 25 articles, and was the confession as well of the Episcopal as of the Presbyterian church. The Covenanters, indeed, during the commonwealth, adopted the Westminster confession. At the revolution this confession was received as the standard of the national faith; and it was ordained by the same acts of parliament which settled Presbyterian church government in Scotland, "that no person be admitted or continued hereafter to be a minister or preacher within this church unless he subscribe the [that is, this] confession of faith, declaring the same to be the confession of his faith." By the act of union in 1707, the same is required of all professors, principals, regents, masters, and others bearing office. The Westminster confession of faith then, and what are called the larger and shorter catechisms, contain the publicly recognized doctrines of this church; and it is well known that these formularies are an embodiment of the Calvinistic faith. There is no liturgy or public form of prayer used in the church of Scotland, the minister's only guide being the "Directory

r the Public Worship of God," which pre-
ribes the matter rather than the exact lan-
age of public devotions. There is an eccle-
astical law requiring the administration of the
ord's supper in every parish four times each
ear; but this law is not rigidly observed, and
the country parishes particularly the ordi-
nance is often administered not above once a
ear. The preparation for this ordinance con-
sts in keeping a public fast on the preceding
hursday, and attending a public service at
hich there is preaching on Saturday. They
ave no altars or chancels, and the communion
bles are introduced for the occasion. At the
rst table, the minister, after offering what is
alled the consecration prayer, proceeds to
ead the words of the institution, and then
stributes the elements to the two communi-
ants on either side of him, and the elders ad-
inister them to the rest. But before or dur-
g the services of the succeeding tables,
ddresses are made to the communicants by
ne or more of the ministers (for there are
everal present) standing at the head of the
ommunion table. In singing they use Rowse's
etrical version of the psalms of David; and
ithin a comparatively recent period there has
een introduced, by permission of the general
ssembly, a collection of translations and para-
hrases in verse of several passages of Scrip-
ure, together with a considerable number of
ymns. The provision which has been made
y the law of Scotland for the support of the
lergy of the established church consists of a
ipend, a small glebe of land, and a manse
arsonage house) and office houses. By an
ct of parliament passed in 1810, £10,000 per
nnum was granted for augmenting the small-
r parish stipends in Scotland. By this act
he lowest stipend assigned to a minister of the
stablishment is £150 sterling, with a small
um, generally £8 6s. 8d., for communion ele-
ents. Patronage was abolished in Scotland
n 1649; was revived at the restoration; was
artly abrogated at the revolution, and again
evived in 1712. The party usually termed
vangelical has been greatly on the increase in
atter years. In the appointment of minis-
ers to vacant churches, much greater at-
ention is now paid than formerly to the
ishes of the people.—The improper exercise
f patronage gave rise to the first secession
rom the established church. At the reforma-
ion, the nobility and barons seized on a large
art of the lands and other sources of ecclesi-
stical revenue belonging to the church, and
ssumed the burden of supporting the clergy
f the new faith, each within his own domain.
Persons naturally thought that they ought to
have the privilege of appointing clergymen
thus maintained at their expense; and this
practice became very common, though it did
not receive the sanction of parliament until the
reign of Queen Anne. In many cases these
appointments were violently resisted. The
doors of churches were locked on the day appointed for ordination, or the services were interrupted by the hostile demonstrations of an enraged populace, or the members of presbytery were assaulted in the streets, so that the military were sometimes summoned to protect them from outrage. Many excellent ministers denounced this system, and at length the Rev. Ebenezer Erskine of Stirling ventured to do this in a formal and very earnest manner in a discourse before the synod of Fife. Refusing to submit to the decision of this court, which was that he should be publicly rebuked for slandering the church, and obtaining no redress from the general assembly, to which he appealed, he, with 3 others, left the establishment in 1733; and they formed themselves into a separate communion, called the Associated Presbytery, which soon became a numerous and flourishing body. In 1739 a schism took place in this body, arising from a difference of interpretation of a clause of what was called the burgess oath, in which the person engaged that he would maintain and defend the religion of his country as by law established. The government deemed this oath necessary to be taken by persons clothed with civil authority, in consequence of suspected intrigues of Jesuits and the probability of a French invasion. One part of the synod argued that the taking of the oath by any of their body was unlawful, as it implied an approval of the principle of a civil establishment of religion, and of all the abuses with which it had been followed in Scotland; while the other maintained that it was simply a declaration binding the individual to defend the Protestant faith against open or secret violence. The former of these were called Antiburghers, the latter Burghers. Both prospered, while the church of Scotland was in several respects proportionally depressed. In process of time these two dissenting bodies began to approximate closely toward each other; mutual jealousies gradually died away, while the original ground of controversy, the burgess oath, being now rendered a nullity by the stability of the government at the close of the French war, no obstacle remained to the effecting of a reunion. Accordingly, in 1820, this was brought about; and the two bodies, thus merged, took the name of the United Secession church. This name was afterward changed to the United Presbyterian church, in consequence of the accession of another body called the Relief. In 1752 a clergyman named Gillespie, being required to officiate at the installation of a clergyman whom he considered unworthy of a place in the ministry, refused to perform the service, and forthwith left the church. But he took another ground than Erskine and his associates; for while they rested their secession on the unconstitutional acts of the church, he struck directly at what he deemed the root of the whole evil, and rejected the principle of an establishment altogether. This became gradually a very influential body; and its union with the United

Secession church, which all contemplated as a sure result, though it might be remote, was hastened by the course of political events in Britain. The passage of the reform bill in 1832 was hailed by the dissenters as the first step toward the separation of the church from the state, and their consequent deliverance from the disabilities to which they had hitherto been subjected. Almost all the clergymen and laity of the United Secession had taken higher ground than that assumed by the Erskines, and were therefore ready to unite with any religious body of corresponding views of Christian doctrine and church government, who would coöperate with them in systematic efforts to overthrow the establishment. Accordingly, a union was formed between these two bodies; but the controversy as to the theory of an establishment was not confined to them; it soon extended to the church of Scotland, and led to the most unexpected and important results. Various causes had been at work from the commencement of the present century to give a more earnest tone to the ministrations in the established church, and probably no two individuals contributed so much to this result as those great lights of the Scottish pulpit, Dr. Andrew Thompson and Dr. Chalmers. From 1833 to 1838 several important changes were effected, such as abolishing a plurality of clerical offices, rendering more complete the course of theological education, deposing from the ministry men of unworthy characters, reforming the system of patronage, and communicating a fresh impulse to the cause of Christian benevolence, and especially of foreign missions. But in the progress of this spirit of reform, the church came into serious collision with the state; and after a protracted course of vexatious litigation, in which the measures of the church were constantly thwarted by the civil courts, the memorable disruption took place, in which originated the Free church. (See FREE CHURCH OF SCOTLAND.) In 1860 the church of Scotland numbered 84 presbyteries, 1,178 ministers, and 1,208 churches; and the United Presbyterian church, at the same time, numbered 31 presbyteries, 526 ministers, and 536 churches. —PRESBYTERIAN CHURCH OF IRELAND. Presbyterians settled in Ireland shortly after the reformation, and were at first admitted to the privileges and emoluments of the Episcopal church. They were not tenacious about matters of church polity, for some of the pastors received ordination at the hands of a bishop, and the people conformed without scruple to some of the ceremonies of the established church. In the reign of Charles I., and during the administration of Laud, the interests of the Irish Presbyterians greatly suffered; the statutes of the college at Dublin, authorizing the admission of Presbyterians to its privileges and honors, were remodelled; their confession recognized in 1615 was set aside; and their ministers were ejected from their charges for nonconformity. During the protectorate of Cromwell they were again raised to the status of ministers of the national establishment. At the restoration, when Charles II. attempted to introduce episcopacy into Scotland, many of the inhabitants took refuge in Ireland, and thereby the cause of Presbyterianism received a fresh impulse. This was not diminished by the accession of William, prince of Orange, to the British crown; for he had been educated in Holland to a decided preference for the doctrines and discipline of that church. Nor did subsequent events tend to lessen his respect for the adherents of that system in Ireland; for when James II. landed there, with a view through the invasion of this kingdom, of overturning the government, the Presbyterians rallied around the standard of their Protestant champion, and by their memorable defence of Londonderry, as well as the assistance they rendered at the battle of the Boyne, materially contributed toward the success of his arms. As a testimony of his gratitude, he doubled the sum originally given for the support of their ministers, hence known as the *regium donum.* In consequence of the increase of churches, as well as the greater expensiveness of the means of living, the sum has been repeatedly augmented by the crown, and is now £70 each. In [illegible] the Presbyterian church was composed of the following bodies: the general synod of Ulster, the Presbyterian synod of Munster, the presbytery of Antrim, and the Seceders and Covenanters. The first two and most prominent of these have since united, forming a body which embraces 5 synods, 36 presbyteries, 491 congregations, and 593 ministers, and raises annually for missions and missionary schools about £9,000, beside sustaining various other evangelical enterprises. Though recognizing the principle of a civil establishment of religion, its views of the subject are more in harmony with those of the Free church than of the established church of Scotland.—PRESBYTERIAN CHURCH IN THE UNITED STATES. The Presbyterian church of the United States is undoubtedly to be reckoned as a daughter of the church of Scotland. Presbyterians began to emigrate from Scotland and the north of Ireland to the American colonies as early as 1689; and they quickly manifested a disposition to reproduce here their own peculiar institutions. The first and largest churches were established in Pennsylvania and Maryland, two colonies distinguished from the earliest times for their just notions of religious liberty. The Puritan element early found its way into the body from New England, and the reformed churches of the continent of Europe have from time to time made contributions to it; but the original organization has always remained substantially the same. The ministers of whom we first hear as preaching and laying the foundation of churches were the Rev. Francis McKemie and the Rev. John Hampton, the former from the north of Ireland, the latter from Scotland, both of whom appear to have sent to this country by a body of dissent- in London for the purpose of preaching the spel in the middle and southern colonies. ey fixed their residence on the eastern shore Virginia, near the borders of Maryland, and lied forth on their preaching tours in every ection where their evangelical labors were ely to be acceptable. It is ascertained that ere were several churches established some me before the close of the 17th century. In aryland there were the churches of Rehoboth, ow Hill, Upper Marlborough, Monokin, and comico, the first mentioned of which is com- nly considered the oldest, and was probably rmed as early as 1690. The church on Eliza- eth river in Virginia is supposed by some to ate back to nearly the same period. The urches in Freehold and Woodbridge, N. J., ere constituted in 1692; and the first church Philadelphia, as nearly as can be ascertained, 1698. In New Castle, Del., in Charleston, C., and in some other places, Presbyterian urches were planted at a very early period. the latter part of 1705, or early in 1706, a resbytery was formed under the title of the esbytery of Philadelphia, among whose mem- ers were the Rev. Messrs. Francis McKemie, ohn Wilson, Jedidiah Andrews, Nathaniel aylor, George McNish, John Hampton, and amuel Davis. Mr. Andrews was from New ngland, and was graduated at Harvard col- ege in 1695; the rest were all emigrants from cotland or Ireland. As early as 1716 the Pres- byterian body had so far increased that some ew organization was thought desirable; and ccordingly there were constituted, instead of one, four presbyteries, namely, those of Philadelphia, of Newcastle, of Snow Hill, and of Long island; and these presbyteries were formed into a synod, under the name of the synod of Philadelphia. Shortly before this arrangement took place, several churches, with their ministers, in East and West Jersey, and on Long Island, hitherto Congregationalists, had connected themselves with the Presbyterian church. From the period of the formation of the first synod in 1716, the body increased rapidly by means of emigrants, not only from Scotland and Ireland, but from Wales, France, Holland, and Switzerland; while numbers from New England also were induced, from local considerations or other circumstances, to cast in their lot with this denomination. The consequence was that the Presbyterian church began to assume a somewhat heterogeneous character, and the harmony of its operations was proportionately diminished. The points on which the conflicts of opinion were most strongly marked, were the examination of candidates for the ministry on experimental religion, the strict adherence to presbyterial order, and the requisite amount of learning in those who sought the ministerial office. In the several presbyteries these points were discussed with great and often intemperate zeal. Two distinct parties were now formed; those who were more zealous for orthodoxy, for the rigid observance of Presbyterian rule, and for a thoroughly educated ministry, were called the old side; while those who looked upon departures from ecclesiastical order with more forbearance, and were less particular in respect to other qualifications for the ministry, provided they could have evidence of genuine piety, were called the new side or new lights. In 1729 the synod passed what was commonly called the adopting act, which consisted of a public authoritative adoption of the Westminster confession of faith and catechisms, and made it imperative that not only every candidate, but every actual minister of the church, should, by subscription or otherwise, in the presence of the presbytery, acknowledge these instruments respectively as their confession of faith. This act had to encounter great opposition, especially from those ministers who had come from England, Wales, and the New England churches. The old side, or strict Presbyterians, having thus gained their main point, the other side felt that something was to be conceded to them also; and accordingly, in 1734, they brought an overture to the synod, directing "that all candidates for the ministry should be examined diligently as to the experience of a work of sanctifying grace on their hearts, and that none be admitted who are not in a judgment of charity serious Christians." Though this overture was adopted unanimously, it was the harbinger of great disquietude. The two acts, embracing the favorite objects of both parties, it was found difficult to carry into execution; for the practice of the several presbyteries was decided by the accidental circumstance of one party or the other being in the ascendant; and this occasioned much debate, and sometimes painful collisions, at the synodical meetings. In 1738 the strict Presbyterians prevailed on the synod to pass an act directing "that young men be first examined concerning their literature by a committee of synod, and obtain a testimonial of their approbation before they can be taken on trial before any presbytery." The presbytery of New Brunswick, regardless of this synodical decree, proceeded almost immediately to take Mr. John Rowland on trial, and shortly after licensed him to preach. This brought that presbytery and the synod into direct conflict; the consequence of which was that, at the next meeting of the latter body, Mr. Rowland's license was formally annulled. One member of the Philadelphia presbytery, however (William Tennent, senior), recognized the validity of his license by inviting him to preach; and when some of his congregation made complaints against him to his presbytery, he earnestly defended his course, denied the authority of the presbytery to act in the case, and "contemptuously withdrew;" whereupon the presbytery censured his conduct as "irregular and disorderly." This took place in Oct. 1739. Within a few weeks after, the presbytery of New Brunswick, adhering to the ground which they had already taken, proceeded to ordain Mr. Rowland to the work of the ministry; and he continued a member of that presbytery until 1742, when he was dismissed to join the presbytery of New Castle. About this time Whitefield paid his second visit to America. The great revival that took place in connection with his labors was differently viewed among the ministers of the Presbyterian church, as well as among those of New England; the new side regarding it with almost unmixed favor, while the old side had a sharp eye for all the irregularities attending it, and were not slow to pronounce the whole a delusion. Undue warmth of feeling and speech, improper inferences, and even mutual crimination, were indulged in, until at length, in 1741, the synod was rent asunder, the old side constituting the synod of Philadelphia, the new side the synod of New York. Soon after the separation, the synod of New York began to look toward the education of its future ministers in taking measures for the establishment of the college of New Jersey. This institution commenced its operations in Elizabethtown in 1746, but was removed to Newark the next year, where it remained till 1757, when it was finally removed to Princeton. Meanwhile the academies of New London and Newark in Delaware, under the Rev. Francis Allison and the Rev. Alexander McDowall, were liberally patronized by the old side. An intense rivalship grew up between the institutions of the respective parties, which served to increase not a little their mutual hostility. But the contest finally gave way under the influence of time. Both parties gradually became convinced that they had acted improperly, and began at length to meditate a reunion. In 1749 the synod of New York made the first overtures in that direction; but it was not till 1758, making the period of separation about 17 years, that the desired consummation was reached. In the course of that year, mutual concessions having been made, the articles of union in detail were happily adjusted, and the synods united under the title of "the synod of New York and Philadelphia." At the time of the disruption the old side was the more numerous, but before the reunion the new side had become so. Among the ministers that were most conspicuous during this period of separation and conflict, were some of those mentioned above, who still survived, together with the 4 sons of the Rev. William Tennent—Gilbert, William, John, and Charles—President Dickinson of Elizabethtown, President Burr of Newark, President Davies, President Finley, the Blairs, &c., all of whom ranked as new side men. The Rev. Messrs. John and Samuel Thompson, Dr. Francis Allison, the Rev. Robert Cross, and several others, were among the most prominent on the old side. From the period of the reunion, the Presbyterian body went on in a good degree of prosperity, considering the disturbed state of the country, until the close of the revolutionary war, when they could reckon about 170 ministers, and a few more churches, chiefly in the states of New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and the Carolinas. At the meeting of the synod of New York and Philadelphia in May, 1785, the independence of the United States being now established, that judicatory began to take those steps for revising the public standards of the church, which led to their adoption and establishment on the present plan. A committee, consisting of Drs. Witherspoon, Rodgers, Robert Smith, Patrick Allison, Samuel Stanhope Smith, John Woodhull, Robert Cooper, James Latta, George Duffield, and Matthew Wilson, was appointed to "take into consideration the constitution of the church of Scotland and other Protestant churches," and to form a complete system for the organization of the Presbyterian church in the United States. In May, 1788, the synod completed the revision and arrangement of the public standards, and ordered them to be printed and distributed for the government of the several judicatories of the church. The new arrangement consisted in dividing the old synod into 4 synods, namely, the synods of New York and New Jersey, of Philadelphia, of Virginia, and of the Carolinas, and constituting over these, as a bond of union, a general assembly, of essentially the same type with the general assembly of the church of Scotland. The Westminster confession of faith was adopted with three slight alterations, and the larger and shorter catechisms with but a single alteration; and a form of government and discipline and a directory for public worship, drawn chiefly from the standards of the church of Scotland, with such modifications as the U. S. form of government and the state of the church in this country were thought to demand, completed the system. Since the date of the revisal and arrangement just mentioned, no alteration has been made either in the confession of faith or in the catechisms of the church. The form of government and discipline have undergone two revisions, and a third is now (1861) in progress.—In 1801 a "plan of union between Presbyterians and Congregationalists in the new settlements" was formed, with a view to prevent disagreement between the two denominations, and to facilitate their coöperation in carrying forward various evangelical enterprises. This arrangement continued 36 years, and under it were formed hundreds of churches in the states of New York and Ohio. Previous to 1830 it had become apparent that there were really two parties in the Presbyterian church, the one favoring a more rigid, the other a less rigid construction of the standards of the church, which, though not often brought into actual collision, had occasion sometimes, in meeting a test question, to indicate their distinct existence. This was especially true of the celebrated case of the Rev. Albert Barnes, which, more decisively than any other which had previously occurred, pointed to a proaching disruption of the church. From s time the parties assumed toward each other more and more opposing attitude, with each cessive meeting of the general assembly, till 1837, when, after an intense conflict, the an of union was abrogated, and the 4 syn- ds of Genesee, Geneva, Utica, and the West- n Reserve were adjudged as no longer nstituent parts of the Presbyterian church; d the division thus commenced was con- mmated the next year. Since that period e Presbyterian church has consisted of two stinct bodies, known as the Old and New hool, entirely independent of each other. t the first meeting of the general assembly 1789, there were from 180 to 190 min- ters belonging to the whole Presbyterian dy. These were distributed into 4 synods d 17 presbyteries, embracing a large num- r of vacant congregations. In 1837, pre- ous to the rescinding of the western synods, e Presbyterian church contained 23 synods, 5 presbyteries, 2,140 ministers, 2,865 church- , and 220,557 communicants. In 1860 the ld School Presbyterian church contained synods, 171 presbyteries, 2,693 ministers, 592 churches, and 292,857 communicants. The ew School Presbyterian church had at the me time 23 synods, 104 presbyteries, 1,527 nisters, 1,483 churches, and 134,933 commun- icants. The aggregate of both bodies is 55 ynods, 275 presbyteries, 4,220 ministers, 5,075 hurches, and 427,790 communicants. The Old School church has boards of domestic mis- ions, foreign missions, education, publication, nd church extension. The New School has ommittees of publication, church erection, hurch extension, education, foreign missions, nd home missions. The amount contributed o the Old School body in the year ending May, 860, was $2,357,296; the amount contributed n the New School body during the same year as $305,985; total, $2,663,281. Connected ith the Old School are 6 theological semina- ies, viz.: Princeton, N. J.; Western, Allegha- ny, Penn.; Union, Prince Edward, Va.; Dan- ville, Ky.; and of the North-West, Chicago, Ill. There is also a seminary, not under the mmediate care of the general assembly, in Co- lumbia, S. C. In the New School there are 5 theological seminaries, viz.: Union, New York city; Auburn, N. Y.; Lane, near Cincinnati, O.; Blackburn, Carlinville, Ill.; and Lind, Chicago, Ill.—Notwithstanding Presbyterian- ism has never prevailed extensively in New England, it has had a distinct and independent existence there from a very early period. The French church in Boston, formed of Huguenots about the year 1687, was the first church organized on a Presbyterian basis, but was continued no longer than while its service was conducted in the French language. The first Presbyterian organization in New England of any permanence dates back to about the year 1718, when a large number of Presbyterians, with 4 ministers, emigrated to this country from the north of Ireland. For some time, in cases of difficulty, the ministers and elders were wont to assemble informally, and hold what might be called *pro re nata* meetings; and where they were unable to reach a satisfactory result, they sometimes asked advice of the synod of Ireland. In 1745 the ministers resolved, as preparatory to the step they were about to take, to observe, in connection with their congregations, the third Wednesday of March as a day of fasting, humiliation, and prayer. On April 16 following, the Rev. Messrs. John Morehead of Boston, David McGregor of Londonderry, and Ralph Abercrombie of Pelham, with Messrs. James McKeen, Alexander Conkey, and James Hughes, met in Londonderry, and being "satisfied as to the divine warrant, with dependence on God for counsel and assistance, they, by prayer, constituted themselves into a presbytery, to act, as far as their present circumstances will permit them, according to the word of God and the constitution of the Presbyterian church of Scotland, agreeing to that perfect rule." The body was called the Boston presbytery, and met, according to adjournment, in that town, Aug. 13, 1745. From the close of the year 1754 till Oct. 1770, there is a chasm in the records; but at the last mentioned period the presbytery consisted of 12 congregations and as many ministers. At a meeting held at Seabrook, N. H., on May 31, 1775, the presbytery resolved to divide itself into 3 distinct bodies, viz., the presbyteries of Salem, of Londonderry, and of Palmer; and the 3 presbyteries, thus organized, were then formed into a synod called the synod of New England, which held its first meeting at Londonderry, Sept. 4, 1776. At Boothbay, Me., on June 27, 1771, a new presbytery was erected, called the presbytery of the Eastward, consisting of 3 ministers and 4 ruling elders, representing 4 churches. It had no connection with the Boston presbytery, and its origin is said to have been in some way connected with the removal of the Rev. John Murray to Boothbay. It never exhibited on its roll more than 8 ministers. Its last recorded adjournment now known was to meet at New Boston, N. H., on the first Wednesday of Oct. 1792. The only relic of this presbytery known to exist is a curious volume printed in 1783, with the following title: "Bath-Kol. A Voice from the Wilderness. Being an humble Attempt to support the sinking Truths of God against some of the principal Errors raging at this time. Or a joint Testimony to some of the grand Articles of the Christian Religion, judicially delivered to the Churches under their care. By the First Presbytery of the Eastward." In Sept. 1782, the synod of New England, finding their numbers considerably reduced in consequence of existing difficulties, agreed to dissolve and form themselves into one presbytery, under the name of the presbytery of Salem. For two succeeding years this presbytery met regularly in Massachusetts proper, but after this its meetings were held in the district of Maine. Its last meeting was held at Gray, Sept. 14, 1791, at the close of which it adjourned *sine die*. The third Associate Reformed presbytery, afterward called the Associate Reformed presbytery of Londonderry, was formed in Philadelphia, Oct. 31, 1782, and held its first meeting at Londonderry, N. H., on Feb. 11, 1783. It ceased to belong to its original denomination in 1802, and was an independent presbytery until 1809, when it was received into the synod of Albany, and has since continued under the name of the presbytery of Londonderry. The presbytery of Newburyport was formed by the concurrent action of the presbytery of Londonderry and the synod of Albany. It held its first session in Boston on Oct. 27, 1826, and its last on Oct. 20, 1847, when it became reunited to the presbytery of Londonderry. The presbytery of Connecticut, consisting of several ministers and churches previously belonging to the presbytery of New York, was constituted by the synod of New York, Oct. 15, 1850, and held its first meeting at Thompsonville on Oct. 29.—UNITED PRESBYTERIAN CHURCH OF NORTH AMERICA. As this body is composed of the Associate Reformed and the Associate churches, it may be proper to present an outline of the history of each of these bodies up to the time of the union. 1. *Associate Reformed Church.* In 1680 Lord Cardross took measures for the establishment of a colony in South Carolina, with a view to furnish a place of refuge to his persecuted brethren. This was formed at Port Royal; but, in consequence of an invasion by the Spaniards, the colony was abandoned in 1688. Many, however, remained in Carolina, who were gathered into congregations under the care of a presbytery, which continued to exist until about the close of the 18th century. The only one of these churches now remaining is the old Scots' church in Charleston. From 1660 to 1688 a large number of Presbyterians (amounting, according to Wodrow, to about 3,000) were transported to the American plantations and sold as slaves. They were for the most part sent to Virginia, Pennsylvania, and New Jersey; but scarcely any traces of their history now remain. In 1736 the Associate presbytery of Scotland received a letter from a number of persons in Londonderry, Chester co., Penn., requesting that an ordained minister or a probationer might be sent to them, and promising that all the expenses of the mission should be defrayed by themselves; but the circumstances of the presbytery did not then allow them to comply with the request. The first minister sent to this country by the Secession church was the Rev. Alexander Gellatly, who arrived in 1751, and, after a laborious ministry of 8 years, died at Octorara, Penn. The Covenanters, or Reformed presbyterians, sent out the Rev. Mr. Culbertson in 1751; and in 1774 he was followed by Messrs. Lind and Dobbin. Of these two denominations the Associate Reformed church was made up. In 1754 the Burgher synod, in consequence of repeated and earnest applications, resolved upon establishing a mission in America, though their purpose was not carried out until 1764, when the Rev. Thomas Clark, minister of Ballybay in Ireland, in company with the greater part of his congregation, emigrated to this country, and settled at Salem, Washington co., N. Y. Two other ministers of the same communion followed them two years after, though one of them subsequently returned to Scotland. The Burgher ministers, not being disposed to keep up a separate organization on this side of the Atlantic, united with their brethren; but the union was disturbed by the refusal of the Scottish synod to approve of it. The revolution of 1776 was chiefly instrumental in bringing about the union which produced the Associate Reformed church. During the progress of the war, several conventions were held between the members of the Associate and the Reformed presbyteries with a view to the accomplishment of this end; the result of which was that 3 presbyteries met in Philadelphia in Oct. 1782, and formed themselves into a synod under the name of the Associate Reformed synod of North America, on a basis consisting of the following articles: "1. That Jesus Christ died for the elect. 2. That there is an appropriation in the nature of faith. 3. That the gospel is addressed indiscriminately to sinners of mankind. 4. That the righteousness of Christ is the alone condition of the covenant of grace. 5. That civil government originates with God the Creator, and not with Christ the Mediator. 6. The administration of the kingdom of Providence is given into the hand of Jesus Christ the Mediator; and magistracy, the ordinance appointed by the moral Governor of the world, to be the prop of civil order among men, as well as other things, is rendered subservient by the Mediator to the welfare of his spiritual kingdom, the church, and has sanctified the use of it and of every common benefit, through the grace of the Lord Jesus Christ. 7. That the law of nature and the moral law revealed in the Scriptures are substantially the same, although the latter expresses the will of God more evidently and clearly than the former, and therefore magistrates among Christians ought to be regulated by the general directory of the Word as to the execution of their office. 8. That the qualifications of justice, veracity, &c., required in the law of nature for the being of a magistrate, are also more explicitly revealed as necessary in the Holy Scriptures. But a religious test, any further than an oath of fidelity, can never be essentially necessary for the being of a magistrate, except when the people make it a condition of government. 9. That both parties, when united, shall adhere to the Westminster confession of faith, the catechisms, the directory for worship, and propositions concerning church government. 10. That they shall claim the full exercise of church discipline ithout dependence upon foreign judicatories." pon this basis all the members of the Reformed presbytery, and all the Associate ministers with the exception of two members of n presbytery of Pennsylvania (Messrs. Marshall and Clarkson), united. A small minority of the people in the two communions also eclined to enter into it; and in these minorities have been preserved the Covenanter or eformed Presbyterian denomination on the one hand, and the Associate on the other. The arliest settlements of the Associate Reformed hurch were in Pennsylvania, within the Cumberland valley; but colonies from these emigrated to South Carolina and Georgia, New York, Kentucky, and even to New Hampshire and Maine. One of the first acts of the synod, after its organization in 1782, was the adoption of a series of articles, afterward published under the name of "The Constitution of the Associate Reformed Church;" but these articles were severely attacked both by the Seceders and Covenanters, and were finally laid aside for a fuller exposition of the church's faith. The result was that the Westminster confession and the catechism, after a careful revision at several successive meetings of synod, in the articles relating to the power of the magistrate, were published in a volume in 1799, entitled "The Constitution and Standards of the Associate Reformed Church in North America." The ground occupied by this body was substantially the same with that held by the church of Scotland. For 20 years the growth of the church was very rapid; and this led to the adoption of a measure in 1802, which proved premature and adverse to its prosperity, namely, the division of the church into the 4 provincial synods of New York, Pennsylvania, Scioto, and the Carolinas, under a representative general synod. In 1796 the initiatory steps were taken for the establishment of a theological seminary; and, the requisite funds having been collected, at a meeting of the synod in 1804 the plan of the seminary was framed. Dr. John M. Mason was chosen professor of theology; and the sessions of the seminary began in the autumn of the same year in the city of New York. This was the second theological seminary established in the United States. Dr. Mason's work on "Catholic Communion," published in 1816, was regarded in many parts of the church as a prodigious heresy in regard to the subject of which it treated; and this, in connection with some other grounds of complaint, led the entire synod of Scioto, in 1820, to withdraw from the superintendence of the general synod. In 1821 the synod of the Carolinas petitioned the general synod to be erected into an independent synod, on the ground that they were so distant from the place at which the general synod usually assembled that it was impossible that they should be represented in it. The request was granted. For many years after that the southern synod gained but little in numbers, though in later years it became more prosperous; while the western synod went on rapidly extending itself and becoming more and more vigorous every year. About the time of the separation of the western synod, an unsuccessful attempt was made to unite the Associate Reformed and the Reformed Dutch churches, under the name of the Reformed Protestant church of North America. Immediately after this, measures, which were considered by many of very dubious propriety, were adopted for effecting a union between the Associate Reformed and the Presbyterian bodies; the consequence of which was that a portion of the former church became incorporated with the latter, and the library of the Associate Reformed church was immediately removed from New York to Princeton; though, as the result of a legal process, it ultimately fell back into the hands of its original owners. The synod of New York now resumed its ordinary meetings, and took the place of the general synod as the supreme judicatory of the church in the northern states. But the interests of the church continued in a languishing state till 1829, when the synod resolved to revive the seminary, whose operations had been suspended in 1821, and to establish it at Newburg, under the care of the Rev. Joseph McCarroll, D.D., who was at the same time chosen professor of theology. It thus appears that since 1822 the Associate Reformed church has existed in three independent divisions, at the North, the West, and the South. An attempt was made in 1837 to revive the general synod on the old footing, but it proved a failure.

2. *The Associate Presbyterian Church.* From 1782, the period of the formation of the Associate Reformed church, the Associate church was gradually increased by ministers sent out from Scotland, and also by the return of a considerable part of those who had previously joined the union. The first institution for the purpose of educating students in theology by this body was established in 1793, under the care of the Rev. John Anderson, D.D., of Beaver co., Penn., who continued to serve as sole professor of theology until 1818, when he resigned on account of old age. The presbytery of Pennsylvania, being unable to meet the applications for preaching which were made from Kentucky and Tennessee, directed the applicants to apply directly to the synod in Scotland for missionaries. They did so; and in answer to the petition, the synod sent two missionaries (Messrs. Armstrong and Andrew Fulton) to Kentucky, with authority to constitute themselves into a presbytery. These missionaries arrived in Kentucky in the spring of 1798, and in November following formed themselves with ruling elders into a presbytery, by the name of the presbytery of Kentucky. This accession of strength enabled these presbyteries to form themselves into a synod; and accordingly the synod, or court of review, designated as the Associate synod of North

America, was constituted at Philadelphia in May, 1801. The synod consisted of 17 ministers, who were divided into 4 presbyteries, namely, of Philadelphia, of Chartiers, of Kentucky, and of Cambridge. Until the year 1818 appeals might be taken from the synod to that of Scotland; but at that time it was declared a coördinate synod by the general Associate synod of Scotland. Between the years 1838 and 1840 several ministers were deposed or suspended for various offences, who subsequently formed themselves into a synod, and assumed the name of the Associate synod of North America. Two ministers also in the South, one in Virginia, the other in South Carolina, who were suspended on account of their connection with slavery, became united with the Associate Reformed synod of the South. A minister of the presbytery of Miami also joined with a suspended minister of the same presbytery and formed what they denominated the Free Associate presbytery of Miami.—In May, 1858, the Associate Reformed and the Associate churches, having been separated for more than three quarters of a century, were united again upon a common basis, under the name of the United Presbyterian church in North America. A small number on each side protested against the union. In 1860 this branch of the church embraced a general assembly, 4 provincial synods, 43 presbyteries, 447 ministers, 674 congregations, and about 60,000 communicants. The amount of its contributions for benevolent purposes during 1860 was $253,150. It has theological seminaries at Alleghany, Penn., Xenia, O., and Monmouth, Ill. It has boards of foreign missions, of home missions, of publication, of church extension, and of education. Its periodical publications are one quarterly, one monthly, one semi-monthly, and 4 weekly newspapers.—REFORMED PRESBYTERIAN CHURCH IN AMERICA. At the union of the Associate and the Reformed churches in 1782, a considerable number of the latter as well as of the former communion refused their assent to it, and they continued their original organization. Within 10 years, 4 ministers emigrated from Europe, to aid in maintaining the Reformed Presbyterian cause, viz.: Mr. James Reid from Scotland, who returned to his own country when his missionary tour was accomplished, and Messrs. McGarragh, King, and McKinney, the latter of whom arrived in 1793. The 3 last named gentlemen regulated the affairs of the church as a committee of the Reformed presbytery in Scotland. This, however, was a mere temporary expedient, and its end having been accomplished, Messrs. McKinney and King, in connection with Mr. Gibson, who had then lately come from Ireland, proceeded in 1798 to constitute a presbyterial judicatory independent of all foreign control. This presbytery was styled the Reformed presbytery of the United States of America. In arranging the terms of her communion, she declared that she adopted the Reformed Presbyterian system only in so far as it presents common truth, and "binds to duties not peculiar to the church in the British isles, but common in all lands." Soon after the organization of the presbytery, 4 young men were licensed to preach the gospel, who became efficient missionaries in different parts of the United States. In 18[illegible] a synod, composed of 8 presbyteries, was constituted under the name of the synod of the Reformed Presbyterian church in the United States of North America. In 1825 the supreme judicatory received the form of a representative assembly, composed of delegates from presbyteries, and styled the general synod. The ecclesiastical standards of this church are the Westminster confession of faith and catechisms, and a "Declaration and Testimony," published in 1848. In declaring her approbation of the Westminster confession of faith, she makes the following disclaimer: "To prevent all misunderstanding of the matter of the second article of this formula, which embraces the confession of faith and catechisms, it is declared in reference to the power of the civil magistrate in ecclesiastical things, that it is not now, and never was, any part of the faith of the Reformed Presbyterian church, that the civil magistrate is authorized to interfere with the church of God, in the assertion, settlement, or administration of her doctrine, worship, and order, or to assume any dominion over the rights of conscience. All that appertains to the magistratical power in reference to the church is the protection of her members in full possession, exercise, and enjoyment of their rights. The magistratical office is civil and political, and consequently altogether exterior to the church." Some Reformed Presbyterians have entertained the opinion that the constitution and government of the United States are essentially infidel and immoral; and principally on this ground a number of ministers and private members, in 1838, seceded from the general synod of the church, and formed a separate organization. Reformed Presbyterians are scattered over the middle and western states, and they have a few congregations at the South. The church consists of 7 presbyteries, 56 ministers, and 114 churches and stations. The amount of their contributions to benevolent objects in the year ending May, 1860, was $10,319.24. They have boards of domestic missions, of foreign missions, and of education, and one theological seminary; and they also publish one weekly newspaper.

PRESCOT, a town of Lancashire, England, 8 m. E. from Liverpool; pop. in 1851, 46,527. It stands upon a coal field, and has long been a manufacturing town of importance. The drawing of pin wire had its origin here; and the works of watches, watchmakers' tools, and small files of superior quality are manufactured.

PRESCOTT. I. OLIVER, an American patriot, born at Groton, Mass., April 27, 1731, died there, Nov. 17, 1804. He was graduated at Harvard college in 1750, and afterward prac-

medicine. Before the revolution he was
essively major, lieutenant-colonel, and colo-
in the militia, and in 1776 was appointed
the supreme executive council of Massachu-
a brigadier-general of the militia for the
nty of Middlesex. The same year also he
ame a member of the board of war, and in
7 was elected a member of the supreme ex-
tive council of the state. After serving in
body 3 years, he declined a reëlection. In
8 he was created third major-general of
itia throughout the commonwealth, and in
l second, but soon after resigned. In this
r he received from the government a com-
sion "to cause to be apprehended, and
mitted to gaol, any person whom you shall
m the safety of the commonwealth requires
e restrained of his personal liberty, or whose
argement within the commonwealth is dan-
ous thereto." In 1779 he was made judge
probate for the county of Middlesex, and
d that position until his death. II. WIL-
M, an American patriot, brother of the pre-
ding, born at Groton, Mass., in 1726, died at
pperell, Mass., Oct. 13, 1795. He inherited
arge estate from his father, who was a mem-
r of the governor's council. In 1755 he
ved as lieutenant in the provincial army un-
r Winslow during the expedition against
va Scotia, and his conduct in that campaign
racted the favorable notice of the British
neral coöperating with Winslow, who offered
escott a commission in the royal army, which
e declined. After the war Prescott retired to
estate in Pepperell, where he resided, with
igh reputation for courage, honor, and mili-
ry skill, till 1775, when, on receiving the news
the battle of Lexington, he assembled a regi-
ent of militia of which he was colonel, and
arched to the camp at Cambridge. When
e committee of safety decided to occupy Bun-
r hill, Prescott was selected for this perilous
rvice, and on the evening of June 16 marched
Charlestown with a brigade of 1,000 men,
d threw up the intrenchments behind which
der his command the Americans met the
itish on the following day. It is the con-
mporary record, says Bancroft, that dur-
g the battle "no one appeared to have any
mmand but Col. Prescott," and that "his
avery could never be enough acknowledged
d applauded." He was among the last to
it the field, and immediately offered to re-
ke the position if the commander-in-chief
ould give him three regiments. He served in
e army for two years longer, and was present
a volunteer at the battle of Saratoga in 1777.
fter this battle he returned home, and subse-
ently sat in the legislature of Massachusetts
r several years. III. WILLIAM, LL.D., an
merican lawyer, only child of the preceding,
rn at Pepperell, Aug. 19, 1762, died in Bos-
n, Dec. 8, 1844. He was graduated at Har-
ard college in 1783, and studied law at Beverly
ith Nathan Dane, the distinguished founder
f the law professorship which bears his name

in Harvard university. At Beverly he practised his profession from 1787 to 1789, when he removed to Salem, which town he represented for several years in the legislature, and was subsequently elected by the federal party a state senator. In 1806 and again in 1813 he was offered and refused a seat on the supreme judicial bench of Massachusetts. In 1808 he removed to Boston, and in 1809 and for several years afterward was a member of the governor's council. In 1814 he was a delegate to the Hartford convention, and in 1818 was appointed a judge of the court of common pleas, which office he resigned at the end of a year. He was a delegate to the constitutional convention of Massachusetts, his last public office. The closing years of his life were spent in quiet retirement. "As a practising lawyer," says Mr. Hillard, "no person ever enjoyed in a greater degree the confidence of the community or the respect of the courts. For the last 31 years of his life there was no one in Boston whose counsel was more solicited or more valued in important matters, whether public or private." Daniel Webster, in a public address on the death of Judge Prescott, remarked that at the time of his retirement from the bar of Massachusetts he stood at its head for legal learning and attainment. IV. WILLIAM HICKLING, LL.D., an American historian, son of the preceding, born in Salem, Mass., May 4, 1796, died in Boston, Jan. 28, 1859. His mother, who died in 1852, was the daughter of Thomas Hickling, for many years U. S. consul at the Azores, and was eminently distinguished for benevolence and active charity. At the age of 12, young Prescott removed with his family to Boston, where he was placed in the academy of Dr. Gardiner, a pupil of Dr. Parr. He entered Harvard college in 1811, and was graduated in 1814. In the last year of his student life, while in the college dining hall, a classmate playfully threw at him a crust of bread, which struck one of his eyes, inflicting an injury which deprived the eye of sight except so much as sufficed to distinguish light from darkness. Excessive use of the other eye for purposes of study brought on a rheumatic inflammation, which deprived him entirely of sight for some weeks, and left the eye in too irritable a state to be employed in reading for several years. Subsequently for some years he was enabled to use it for many hours of the day, but eventually it again became so weak that during the latter half of his life Mr. Prescott could only read for a few moments at a time, and could scarcely see to write at all. Soon after leaving college he crossed the Atlantic for the benefit of his eyes, and consulted the most celebrated oculists of London and Paris, who however could give him no effectual relief. He travelled extensively in England, France, and Italy, and resided for several months at Rome and Naples. On his return to Boston after two years' absence, he married and settled for life in his father's family. He had begun the study of the law, but relinquished it in consequence of the state of his eyesight, and resolved to devote himself to literature as a profession in which he could regulate his own hours in reference to what his sight might enable him to accomplish. He had early conceived a passion for historical writing, and in 1819 determined to devote the next 10 years to the study of ancient and modern literatures, and to give the succeeding 10 to the composition of a history. He accordingly applied himself to the study of French and Italian literature, and at one time meditated writing a life of Molière, for which he made an extensive collection of materials. This project, and another for the history of Italian literature, he reluctantly abandoned because of the great amount of reading which they involved. Of his studies in this direction the chief fruits were given to the public in a series of essays in the "North American Review" on "Molière," "Italian Narrative Poetry," and "Poetry and Romance of the Italians," which, with others on kindred topics, were printed in a volume of "Miscellanies" (London and Boston, 1845), of which several editions have since been published. About 1825 Mr. Prescott began to study Spanish literature and history, and after much deliberation selected as the subject of his first work the reign of Ferdinand and Isabella. He made at great expense a collection of materials, and before beginning to write was able with the assistance of his friends in Europe to secure, as he says in the preface to the history, "whatever can materially conduce to the illustration of the period in question, whether in the form of chronicle, memoir, private correspondence, legal codes, or official documents." Among these were various contemporary manuscripts, covering the whole ground of the narrative, none of which had been printed, and some of them but little known to Spanish scholars. But when his materials were collected, his eyes, which for a time had been well enough to enable him to read a few hours each day, became worse than ever. He obtained the assistance of a reader, who however knew no language but English. "I taught him to pronounce the Castilian in a manner suited, I suspect, much more to my ear than to that of a Spaniard; and we began our wearisome journey through Mariana's noble history. I cannot even now call to mind without a smile the tedious hours in which, seated under some old trees in my country residence, we pursued our slow and melancholy way over pages which afforded no glimmering of light to him, and from which the light came dimly struggling to me through a half intelligible vocabulary. But in a few weeks the light became stronger, and I was cheered by the consciousness of my own improvement; and when we had toiled our way through 7 quartos I found I could understand the book when read about two thirds as fast as ordinary English." At a later period Mr. Prescott obtained the services of a reader acquainted with Spanish and other languages of continental Europe, and could with this aid prosecute his studies with some degree of facility. After more than 10 years of labor the "History of Ferdinand and Isabella" was ready for the press. A few copies were privately printed and shown to Mr. Sparks, Mr. Ticknor, and other friends, whose cordial approbation at length encouraged the diffident author to publish the work. It appeared in Boston and London toward the end of 1837, in 3 vols. 8vo., and was immediately received with great favor by the public. Don Pascual de Gayangos, the eminent Spanish scholar, reviewed it in the "Edinburgh Review," and pronounced it "one of the most successful historical productions of our time." Mr. Richard Ford, who was better versed in Spanish literature than any other Englishman of his day, praised it highly in the "Quarterly Review" as a work "that need not fear comparison with any that has issued from the European press since this century began." The work was soon translated into German, French, and Spanish, and the royal academy of history at Madrid elected the author a corresponding member. Six years of labor were next devoted to the "History of the Conquest of Mexico" (3 vols. 8vo., London and New York, 1848), and four years to the "Conquest of Peru" (2 vols. 8vo., London and New York, 1847). These works were received with the highest favor in all parts of the civilized world, and praises and honors were showered on the author. He was elected a member of nearly all the principal learned bodies in Europe, and in 1845 was made a corresponding member of the institute of France. In 1850 Mr. Prescott made a short visit to Europe, passing a few months in England, Scotland, and Belgium. After his return he applied himself to the composition of a history of the reign of Philip II., which he had long meditated, and for which he had made an extensive collection of books and manuscripts. The first two volumes of this work appeared in Boston in 1855, and the third in 1858. The entire history was intended to comprise 6 volumes, but was never finished. On Feb. 4, 1858, Mr. Prescott experienced a slight shock of paralysis, from the effects of which however he soon recovered and resumed his literary pursuits. Eleven months afterward, while at work with his secretary in his study, he was struck speechless by a second attack of paralysis, and died about an hour afterward. Beside his histories, Mr. Prescott wrote brief memoirs of his friends John Pickering and Abbott Lawrence, and supplied to a Boston edition of Robertson's "History of Charles V." a sequel relating the true circumstances of the emperor's retirement and death.—In person Mr. Prescott was tall and slender, with a fresh and florid complexion, and lively, graceful manners. "His personal appearance," says Mr. Bancroft, "was singularly pleasing, and won for him everywhere in advance a welcome and favor. His countenance had something that brought to t the 'beautiful disdain' that hovers on of the Apollo. But while he was high- ted, he was tender and gentle and humane, voice was like music, and one could never enough of it. His cheerfulness reached animated all about him. He could in- e in playfulness, and could also speak estly and profoundly; but he knew not to be ungracious or pedantic." A similar rait of his personal character was given n after his death by one of his secretaries in mmunication to the New York "Tribune:" r. Prescott's cheerfulness and amiability re truly admirable. He had a finely wrought, sitive organization; he was high-spirited, rageous, resolute, independent; was free m cant or affectation of any sort. Yet no noyance, great or small, the most painful ness or the most intolerable bore, could dis- b his equanimity, or render him in the least grow sullen or fretful or discourteous. He s always gay, good-humored, and manly; st gentle and affectionate to his family, most ul and gracious to all around him. He car- d his kindness of disposition not only into s public but into his private writings. In the undreds of letters, many of them of the most nfidential character, treating freely of other thors, and of a great variety of persons, which wrote at his dictation, not a single unkind or rsh or sneering expression occurs. He was to- lly free from the jealousy and envy so common ong authors, and was always eager, in con- ersation as in print, to point out the merits of he great contemporary historians whom many en in his position would have looked upon as vals to be dreaded, if not detested." In his habits he was singularly methodical, and regulated his daily life by an exact division of time. He rose early, waked by an alarm clock, and clothed himself according to the weather as indicated by the thermometer, putting on so many pounds of clothing more or less, his garments being all marked with their weight in pounds and ounces. He walked 5 miles each day in the open air, or, if the weather was stormy, in the house, in the latter case putting on his hat, boots, and gloves, and taking his cane, as if out of doors. He always walked alone, if he could without discourtesy avoid having a companion, because while walking he occupied his thoughts in composition. His father had the same peculiarity, and both father and son for many years rode out at the same hour in the morning, mounting their horses at the same door, and riding off in opposite directions. To his literary labors he gave 5 hours daily, divided into 3 nearly equal portions of time, and for 2 hours a day listened to novel reading, which he thought stimulated his imagination and enhanced the animation of his style. His favorite novelists were Scott, Dickens, Dumas, and Sue. His accounts of daily expenditures were kept with the greatest exactness, and one tenth of his income was always devoted to charity. From the middle of November to the middle of June he resided in Boston, at No. 55 Beacon street, where he had accumulated one of the finest private libraries in America, being especially rich in Italian and Spanish books. The summer was always passed at Nahant, where he had a cottage, and the autumn at Pepperell, in the farm house in which his ancestor, the commander at Bunker hill, was born and died. In the last years of his life he abandoned Nahant and established his summer residence in the neighboring town of Swampscott. He carried his books with him to his seaside and rural residences, and wrote there with his usual diligence. His mode of composition was as follows. His secretary first read to him all the books that related to the general subject, Mr. Prescott dictating occasional memoranda as the reading went on. The plan of the work was then sketched, a division into chapters made, and the authorities for the topic of the first chapter gathered together and read to him carefully, while he dictated copious notes of their contents and of the reflections or descriptions suggested by them. When the perusal of the authorities was finished, the mass of notes was read and reread to Mr. Prescott until their substance was fully fixed in his mind. He then sat down to write, using for the purpose a writing instrument made for the blind, consisting of a frame of the size of a sheet of quarto letter paper traversed by as many brass wires as there were to be lines on the page, and with a sheet of carbonated paper, such as is used for getting duplicates, pasted on the reverse side. With an ivory or agate stylus he traced his characters between the wires on the carbonated sheet, making indelible marks on the white page below. He wrote with great rapidity, in a hand so illegible that none could read it but himself and his secretary. The latter copied the manuscript as fast as written in a large and legible hand, on paper so ruled that there was twice the usual space between the lines to afford room for interlineation. When the chapter was finished, it was read to him several times, carefully revised, and again copied before being sent to the printer. He took comparatively little pains with his style, but was unwearied in his efforts to ascertain the truth of history. "The excellence of his productions," says Mr. Bancroft, "is transparent to every reader. Compare what he has written with the most of what others have left on the same subject, and Prescott's superiority beams upon you from the contrast. The easy flow of his language, and the faultless lucidity of his style, may make the reader forget the unremitting toil which the narrative has cost; but the critical inquirer sees everywhere the fruits of investigation rigidly and most perseveringly pursued, and an impartiality and soundness of judgment which give authority to every statement and weight to every conclusion." Edward Everett, in an address before the Massachusetts historical society, shortly after Mr. Prescott's death, said: "So long as in ages far distant, and not only in countries now refined and polished, but in those not yet brought into the domain of civilization, the remarkable epoch which he has described shall attract the attention of men; so long as the consolidation of the Spanish monarchy and the expulsion of the Moors, the mighty theme of the discovery of America, the wonderful genius of Columbus, the mail-clad forms of Cortes and Pizarro, and the other grim *conquistadores*, trampling new-found empires under the hoofs of their cavalry, shall be subjects of literary interest; so long as the blood shall curdle at the cruelties of Alva, and the fierce struggles of the Moslem in the East; so long will the writings of our friend be read. With respect to some of them, time, in all human probability, will add nothing to his materials. It was said the other day, by our respected associate, President Sparks (a competent authority), that no historian, ancient or modern, exceeded Mr. Prescott in the depth and accuracy of his researches. He has driven his Artesian criticism through wretched modern compilations, and the trashy exaggerations of intervening commentators, down to the original contemporary witnesses; and the sparkling waters of truth have gushed up from the living rock. In the details of his narrative further light may be obtained from sources not yet accessible. The first letter of Cortes may be brought to light; the hieroglyphics of Palenque may be deciphered; but the history of the Spanish empire, during the period for which he has treated it, will be read by posterity for general information, not in the ancient Spanish authors, not in black letter chronicles, but in the volumes of Prescott."—A life of Prescott is in preparation (1861) by Mr. George Ticknor of Boston, the historian of Spanish literature.

PRESCRIPTION (in the Roman law, *præscriptio*), a title acquired by possession, during the time and in the manner fixed by law. It is a natural and immutable principle, says Domat, that the owner of a thing shall remain so, and enjoy therefore all the rights of ownership, until his property is divested either by his voluntary act of alienation, or in some other legal mode. And it is another natural rule of the law, that he who has been for a long time in possession of a thing shall be regarded as the owner of it; because, in the first place, men are naturally careful not to give up what belongs to them, and in the second place, because it would be unreasonable to presume without proof that a possessor is a usurper. Yet, if the former of these rules, he continues, be carried to its furthest extent, it will follow that he who can show that either he, or they through whom he claims, have been owners of an estate, will recover it from the possessor, no matter how long the latter or his ancestors may have been in possession, unless he (the possessor) can show a particular divestiture of the claimant's title. If, on the other hand, it is to be imperatively presumed that possessors are in all cases owners, injustice will sometimes be done by depriving of their property those who chance to be out of possession. Some arbitrary rule must therefore be contrived to reconcile these conflicting natural rights of owners and possessors. This end would obviously be attained by prescribing a time within which those who claim to be owners, but are not in possession, shall prove their rights, and after the lapse of which possessors who have not been evicted shall be maintained in their possession. That this obvious rule is also a reasonable one will appear, when it is remembered that occupancy and continued use make the very foundation of title to things, and that the requirement of uninterrupted possession for a given period is only an application of the universal rule of acquisition. As a rule of this nature is then essential, it will be found to exist in all systems of law. Here we have to do only with the prescription of our law. The cognate subject of limitation is treated elsewhere. (See Limitation, Statutes of.)—In strictness the common law allowed only incorporeal rights, such as easements, rights of way, and watercourses, to be prescribed for. Lands and corporeal rights were provided for by the statutes of limitation. Bracton, however, who was one of the earliest writers upon the English jurisprudence, and who wrote before the statutes of limitation were so nicely developed as they now are, and who moreover borrowed much of his learning immediately from the Roman law, lays it down that undisturbed enjoyment may as well give title to corporeal as to incorporeal rights, and that was the principle of *præscriptio* in the code of Justinian. American law, though it has, like the English law, its prescription and its limitations, yet does not so strictly as that limit the application of either, but seems sometimes to hold with Bracton that prescription may as well apply to lands as to rights of common or way. So Judge Story once remarked, that "the arguments for prescription apply, it is plain, as well to lands as to incorporeal rights." (7 Wheaton, 109, 110.) The period which gives prescriptive right has varied in the law. Anciently the law required that the right claimed should have existed undisturbed from time immemorial, or, as the old phrase is, "from time whereof the memory of man runneth not to the contrary." When, by the statute of Westminster the first, in the time of Edward I., writs of right were limited to a certain period, it was thought reasonable that the period of prescription should have a like limitation, and claims of right were therefore declared to be indefeasible if they existed before the first day of the reign of *Richard I.* (July, 1189), but were invalidated if they had a later origin. By later statutes the period of limitation in real actions was still further reduced, and it would have been only reasonable to conform to it the time of legal memory or prescription. This was, however, not done, and it was left for a long time to the courts to remedy the unfairness by equitable construction. The device was hit upon by them of presuming, in case of the long enjoyment of an easement, that there had been a formal grant, of which the evidence, that is to say, the deed, was lost. If this presumption were not rebutted by proof to the contrary, the occupant's title was confirmed. The effect was, that though prescriptive right commencing after the reign of Richard I. was not sustained, for the law on that point was explicit and still imperative, yet possession for a period far less even than that of legal memory sufficed to warrant the presumption of a grant. Prescription in its old sense was rarely pleaded, and time of legal memory came to be of little importance. But later, and particularly by the statute 2 and 3 William IV., the time of prescription was definitely limited by express enactments to periods varying from 60 to 20 years, according to the circumstances and the nature of the right claimed. The tendency of all modern legislation, indeed, is to substitute a short certain period in lieu of the old immemorial prescription. This last has been abolished in France, in Austria, where the prescriptive periods vary from 6 to 40 years, and in Prussia, where they range from 10 to 50 years. In the United States the policy of the law has been to make the time of prescription analogous to that of the statutes of limitation; in other words, to apply the same rule to like cases; so that we are gradually bringing the cognate matters of prescription and limitation together again, and throwing them under virtually one title, as they should be in fact, and as they are in foreign codes. This rule of the American law is not only a plainly expedient one, but, as we have seen, it is the one by which the English period of prescription was first defined. Furthermore, the English time of legal memory was a purely arbitrary one. When then it became necessary for American law to fix such a time, there was already the precedent for settling upon an arbitrary period; but there was beside good reason why it should not follow the English rule, but should adopt one better suited than that to the age and circumstances of the country. The better opinion is that our time of legal memory was generally 60 years, and that therefore was the prescriptive period. Afterward, following the statutes of limitation, it was reduced generally to 40 years. More lately, and indeed now for a long time, adverse, exclusive, and uninterrupted enjoyment for 20 years affords in most states conclusive presumption of right. Still conforming to the statutes of limitation, the time of prescription is in some states less than that, as, for example, 15 years in Vermont and Connecticut. The doctrine of prescription is not only applicable, but in many respects peculiarly applicable to the circumstances of our country. The same arguments for it which apply everywhere else apply equally here; namely, the considerations that occupancy is universally the origin and first ground of title; that long undisturbed possessors ought to be protected in their occupancy; and that even where lands have been transferred by formal instruments of conveyance, yet these may be lost. But that the principle of prescription is introduced into our law with singular fitness will appear when it is remembered that in this country all titles, even the oldest, are comparatively recent; that unjust eviction might be in many cases easier than in older countries; that during the rapid settlement of large districts of the country the original instruments of conveyance were often rude and technically inexact; and finally, that in many localities the original settlers had no other right than that which occupancy gave them, a title which custom recognized at the time as sufficient, but of which subsequent grantees could show no written evidence.—Now, to regard briefly the particular qualities of prescription, it is to be remarked in the first place that the enjoyment of the right prescribed for must have been adverse; that is to say, it must either have invaded or limited the exercise of such a right of the owner as he could have asserted by action. Prescription therefore cannot be pleaded when possession has been enjoyed by the mere permission or license of the owner, for this recognizes the owner's title; in short, the possession must have been enjoyed as of the possessor's right. Possession must also have been uninterrupted; for he who ceases to hold possession seems himself to admit his lack of title. Claim of prescriptive right is also extinguished by unity of possession. Thus, if B has acquired by long enjoyment a right to have water flow through his land by artificial courses upon A's estate, and then A buys B's land, and makes a conveyance of the land which once was B's, the grantee cannot claim a prescriptive right to the water courses. Moreover, the right claimed by prescription must have been certain and reasonable. There can be no prescriptive right to do a wrong, or any thing that would be a nuisance to another; nor can exclusive right be prescribed for in respect to a common privilege, for example, by one who has pastured his cattle for the prescribed period upon a common or a highway, or has enjoyed a way along a beach which is used in common by fishermen, fowlers, weed-gatherers, *&c.* Yet, as a member of the community, an individual may assert prescriptive right in a public easement, as for example in a common landing place or a highway. The claim of prescription must be proved substantially as it is pleaded; yet slight and unessential variations in the proof will not invalidate the claim of right. In almost all the states the doctrine of prescription is now regulated, in its application to the various classes of rights, by express statute provisions. Generally 20 years' uninterrupted possession is required for the acquisition of real rights; and by statute in Massachusetts, and by substantially the same provisions in Maine, Indiana, and probably other states, the owner of land may defeat prescriptive acquisition by notifying the occupant of his intention to dispute the title. This notice operates in behalf of the real owner as a legal interruption to break up the running of the prescriptive time; while the claimant may treat it as a trespass or a tortious intrusion on his presumed ownership, and bring an action to determine the right.

PRESERVATION OF FOOD. All articles used as nutriment (see Aliment) are themselves of organic nature, and consequently subject to rapid decay. The elements of which they consist, chiefly carbon, hydrogen, oxygen, and nitrogen, are loosely held in their various combinations, and constantly tend to return to the simpler and more stable compounds recognized as inorganic. Thus carbon, which constitutes about one half the weight of dry vegetable matters and a large proportion of animal substances, is ever ready to leave the elements that hold it in these bodies, and, uniting with a due proportion of oxygen, escape in the form of carbonic acid gas; hydrogen in like manner seeks its atom of oxygen, with which to form water; nitrogen combines with hydrogen to produce the volatile ammonia, and more hydrogen is still removed in combination with sulphur in the noxious gas sulphuretted hydrogen. (See Combustion, Eremacausis, Fermentation, and Putrefaction.) Food being irregular in its supplies, and also required in places where it is not naturally produced, it is important to be able to check the tendency to decay, that stores of it may be retained for use whenever and wherever needed. As the presence of water or almost any fluid facilitates these changes, mechanically by increasing the mobility of the particles, and also by the chemical reaction of its elements, the permanence of the compounds cannot fail to be increased by its removal. For this reason, the practice of drying meats in the sun or by a fire has been very generally adopted, even among rude nations. The flesh of the buffalo and the deer is thus preserved by the Indians of the West, and the Mexicans and Spanish Americans have long applied the same method to the preservation of beef, which, cut into long strips, dipped in brine, and hung upon lines to dry in the sun, they designate *tasajo*. Such meat may be reduced to powder by pounding it in a mortar, and thus prepared it is sometimes mixed with corn meal and packed in tight bags of skin to be kept as long as need be. It is also sometimes mixed with half its weight of melted fat, or with marrow and dried currants or berries, and again with flour, oatmeal, or powdered hard bread. Such is the pemmican of the north-west *voyageurs*. Glue is the gelatine of animal bodies preserved by thorough drying. Fish are also preserved by the same method. Codfish taken on the banks of Newfoundland are immediately split open, and thrown with some salt into the hold of the vessel, whence they are afterward taken and spread out upon rude stands of wicker work called flakes, and left for weeks to become thoroughly dry. Salt, which is used as an auxiliary in these processes, is effective from its property of abstracting moisture from [illegible] in contact with it; it penetrates the pores of the meat, and places one third or one half of the water the meat contained in a condition powerless for injury. It is more efficient in dry salting than in the condition of brine, a solution of salt, which still, however, preserves meats immersed in it. Beside merely absorbing moisture, it probably has some action on the muscular tissue, the nature of which is not understood. It certainly dissolves and removes much of the nutriment contained in the juice of the meat, and thus causes a considerable loss. Sugar has the same property with salt of taking up the moisture from bodies, and is an important agent in some processes of preserving food. Choice fish, as salmon, are sometimes kept by rubbing in sugar and afterward drying, and hams of superior quality are thus known as "sugar-cured." Sirups are produced with the juices of fruits which are boiled with sugar, and if these sirups are strongly saccharine they are little liable to undergo change. Saltpetre possesses the drying property in a [illegible] degree than salt or sugar. It is often used with salt, probably for the sake of the reddening action it has upon the animal fibre, thus correcting the somewhat bleaching property of salt. Smoking, which is another important method of preserving meats, is efficient in part from the drying action of the heat, and in part from the antiseptic properties of the pyroligneous acid and creosote generated in the [illegible] combustion of the wood fuel. Some woods impart a peculiar flavor to the smoked meats which is not always objectionable. Westphalia hams are thus flavored by the juniper wood with which they are smoked. Care is necessary in smoking as well as in drying meat to prevent the temperature from exceeding [illegible] F., the effect of greater heat being to coagulate the albumen and render it insoluble and innutritious. For some articles of food this is not objectionable, and vinegar is used as a powerful preservative, its action being exerted to render the albumen (the ingredient most ready to undergo putrefactive fermentation) inert and consequently indigestible. But the articles thus preserved, as pickles, &c., are esteemed rather as appetizers than for the nutriment they afford. Low temperature is a perfect protection against changes in organic compounds. At the freezing point the juices are fixed by congelation; and at several degrees above their elements are little disposed to change. At the extreme cold of high latitudes animal substances may be kept for indefinite periods, as was exemplified in a wonderful manner by the discovery in 1779 of the extinct species of elephant in the ice of northern Siberia, the flesh of which was unchanged, and served for the food of wolves. The markets of northern countries are often supplied with frozen meats

d fish brought from distant places, and kept
r a long time. Supplies of beef and pork at
ke Superior, instead of being "put down"
the autumn, are commonly hung up as the
nimals are killed, and at any time during the
inter fresh meat is cut from the pieces.
evere frost is injurious to the flavor; but a
gular temperature at or a little above the
eezing point is effectual to preserve meats
ithout impairing their good qualities. After
eing frozen the thawing should be gradual, or
udden putrefaction is likely to ensue. Vege-
ables and fruits are best preserved in large
uantities in dry places where the temperature
uniformly low, but above freezing; as in cool
ry cellars, and caves specially made for this
rpose in dry sand banks. The introduction
f refrigerators, or ice boxes, in markets and
rivate houses, effects an immense saving in the
reservation of meats from decay.—Common
ir, or oxygen, is as essential to the decay of
rganic bodies as moisture; hence, if it is ex-
luded, they are preserved. Fruits are pro-
ected by their natural skin; but if this is in-
jured, the exposed part is soon affected by the
xygen of the air, and decay goes on from this
oint. Once begun, it is not arrested, though
he air be then excluded. Grapes may be long
reserved carefully packed in saw dust, but the
uncture of the skin of one of them with a
eedle will soon be followed by fermentation.
ence the importance of carefully handling
ruits intended to be kept a long time. Fer-
entation is checked by boiling, and the air
eing then excluded, the articles may still be
reserved. On this principle the most efficient
lans of preserving food in their original con-
ition are founded. M. Appert received in 1810
rom the French government 12,000 francs for
ntroducing his process of parboiling provisions
and then confining them in air-tight jars. His
ethod was perfected by Donkin and co. and
amble of London, and as thus improved is
ow in common use. It has proved of immense
mportance for navy and army supplies, and is
pecially valuable for furnishing fresh meats on
ong voyages. Alimentary substances of almost
ny kind are cooked in the usual way; from the
eats the bones are removed, and they are then
ut in tin canisters with or without vegetables,
nd the canister is immediately filled quite full
with rich gravy. A cover with a small hole
n it is then fitted on, and the vessel is set in
oiling water, or in a hotter saline solution.
he heat expels all the air that may be in the
anister, and steam also issues through the
ittle aperture. This is checked by the appli-
ation of a damp sponge, when the hole is in-
tantly stopped by soldering, and it is exposed
gain to a boiling temperature. As the con-
ents cool they contract, and the cover is bent
a little in by the external pressure of the air.
If afterward, on being exposed to a tempera-
ure of 100° F., putrefaction does not take place
nd burst the canister, no free oxygen is pres-
ent, and there is no risk of the contents spoiling in any climate for any length of time. By a later improvement the air is partially exhausted from the canister while it is standing in hot water, and it is then immediately closed. Cans and bottles are now provided and largely used for preserving fruits, having metallic covers that screw tightly down, and the joint is made still more secure by the application of wax. The fruits are preserved either with or without sugar; and if without, a gill of water is introduced into the can for every quart of fruit. In every case the can is set into boiling water for 15 to 20 minutes before the cover is tightly screwed down, and after this for about half as long. The second boiling is designed to convert any oxygen that may possibly remain in the can into carbonic acid. In Texas a very nutritive and portable food called meat biscuit has been prepared by mixing strong beef broth with flour and baking. This may be cheaply produced in large quantities wherever cattle are destroyed for the sake of their skins only. Methods of preserving milk and butter are given in the articles on those subjects.

PRESERVATION OF WOOD. Under the head of DRY ROT, one of the principal causes of the decay of wood has been considered, and reference was made to some of the methods of preserving wood. The protection of timber from decay is a subject which for some time has been attracting much attention in Great Britain, especially in reference to the use of the timber in ship building, and also in the construction of railroads, the substructure of which consists of wooden sleepers partially buried in the ground, and consequently under the most favorable conditions for rapid decay; and in the United States it is of great importance for the same applications. The methods in use are various, but are generally based upon the principle of expelling the natural juices of the wood and filling the pores with some substance possessing antiseptic properties, that will coagulate the remaining albumen, or that will prevent the admission of moisture. In the petroleum districts of Burmah and the Caspian sea, the quality of the natural rock oil to preserve timber that has been immersed in it is well understood, and the inhabitants employ the article for this purpose. The timber of whale ships is more durable for the oil it imbibes, and the staves of old oil casks are little liable to decay. If timber is well steamed in large tanks and the temperature is suddenly lowered, the pores are freed from the fluids and soluble matters in the wood, and are thus better prepared for the absorption of oil or other preservative liquids. In England no fewer than 47 patents have been granted for processes designed "to preserve animal and vegetable substances, including timber," 4 only of which were in the last century, the earliest in 1737. The first that was extensively applied was the process of Mr. Kyan, patented in England in 1832, and some time afterward introduced into the United States by the inventor.

The wood was immersed in a solution of corrosive sublimate till saturated with it; and if it were necessary to hasten the process, this was done by employing an air-tight tank, exhausting the air, and forcing in the solution by external pressure. When faithfully conducted the effects were perfectly satisfactory; but, except by the use of open tanks, which was an extremely tedious method, the difficulties encountered in the employment of so corrosive a salt, together with the great cost of the material and the introduction of new methods, led to the abandonment of what was known as the kyanizing process.—Of the various preparations now used in England, that of Mr. J. Bethel, consisting of the oily mixtures obtained by a rough distillation of the tarry liquor of gas works, appears to be regarded as the most efficient. A solution of pyrolignate of iron is also similarly effective. From the presence of creosote in these liquors, and its known antiseptic property, the process is called creosotizing. The wood is put into a close tank, from which the air is exhausted, and the operation of the air pumps is continued several hours. The liquid is then admitted, and pressure is applied to the amount of 150 lbs. to the square inch; and this is kept up by continual pumping for 48 hours or longer. Yellow pine is thus increased in weight 11 lbs. to the cubic foot, and Riga pine about 8 lbs. The process is adopted by a large proportion of the railroad companies of England for the preservation of the sleepers, and, notwithstanding its somewhat expensive character, is highly approved of. Timber thus prepared retains a disagreeable smell, which for shipbuilding purposes is objectionable. It is also more inflammable than before. Insects will not attack it, and the preparation is a perfect protection against the *teredo navalis* or ship worm. The fibre of the wood is not only protected from moisture and the destructive action of alternating conditions of dryness and moisture, but it is greatly strengthened, so that the most porous and cheapest sorts of wood may be used for purposes commonly requiring strong oak.—In France the process of Dr. Boucherie has been extensively employed for railway and ship timber. The material used is sulphate of copper (blue vitriol) dissolved in 100 parts of water, so that at 60° F. the density is about 1.006. The timber set on end is covered with a water-tight cap, into which the solution is conveyed through a flexible tube from the tank placed at an elevation of 30 or 40 feet. The sap is first forced out at the lower end by the pressure, and when it is exhausted the copper solution follows and occupies its place. Some kinds of timber are not penetrated by the solution; but it is perfectly effective in filling the pores of beech, birch, larch, Scotch fir, alder, elm, poplar, &c. The time required to complete the operation depends on the kind of wood and the length of the sticks. Timber thus prepared at Fontainebleau for the French navy was fully impregnated in 24 hours in lengths of 9 feet; but sticks of the same timber 40 feet long required 10 days for the completion of the process. Trees felled at any time between May and November were treated within 3 weeks of the time of felling; but if felled between November and May they were kept till the [illegible] month. Sulphate of copper, and the [illegible] also, had been applied in England by [illegible] and used to a considerable extent; so that the novelty in Dr. Boucherie's process is the peculiar and inexpensive method of injecting the solution. It is still extensively practised for preparing sleepers and telegraph posts for the French railways.—Another process also employed in England, and more especially in France, is that of Mr. Payne, patented in England in 1841. The timber is introduced into a long iron cylinder, which is then closed air-tight. Steam is driven in, expelling the air through a valve opened for the purpose, and a cold solution of sulphate of iron (green vitriol) is pumped in, which condenses the steam and produces a partial vacuum. This is made more complete by the air pump, and the cylinder is then filled with the solution, which is still forced in under considerable pressure. In a few minutes the solution is let out and the cylinder is again filled with air. This is again expelled by steam, and a solution of another salt is admitted, of such character as will react upon the sulphate of iron, producing double decomposition and leaving in the pores of the wood an insoluble salt. Chloride of lime answers this purpose, and the insoluble sulphate of lime remains in the wood, the hydrochlorate of iron being absorbed or washed out. Several other salts may be substituted for the lime salt, and among these carbonate of soda has been advantageously employed.—In the United States the process preferred to all the others is that called burnettizing, consisting in the use of chloride of zinc. For this a patent was granted in England in 1838 to Sir William Burnett, but the process was never patented in America. It was first introduced at Lowell, Mass., where in 1850 the "proprietors of the locks and canals on Merrimack river," at the joint expense of the manufacturing companies, erected an apparatus for carrying it on. The works proved so successful and capacious that a regular business was established, and lumber of various sorts has been submitted to the process for railroad companies and other parties at an expense of $5 to $6 per 1,000 feet, board measure. The cylinder in which the operation is conducted is of cast iron, 60 feet long and 5 feet in diameter, with one head movable, the iron [illegible] an inch thick. A rail track of 2 feet gauge leads into the cylinder, and upon this the timber, loaded and chained down upon a heavy low truck, is run in by steam power, the charge amounting to about 7,000 feet. The cylinder head being closed and packed, the air is exhausted by an air pump of 12 inches diameter and 8 feet stroke, and a vacuum is maintained of about 28 inches of mercury, this operation lasting in all about 45 minutes. The pumps are then changed and the cylinder is filled by atmospheric pressure from a large cistern containing a solution of 100 parts of water and 1½ parts of dry chloride of zinc by weight, and the pressure is raised to 125 lbs. to the square inch above the atmospheric pressure. To do this occupies 20 minutes, and the pressure is maintained 2½ hours longer. The surplus solution is then drained off into the cistern, for which 1½ hours are allowed; the cylinder head is then unlocked, and the truck with its load drawn out. The whole time occupied, including the loading and unloading, is 7 hours and 20 minutes. To produce the best results, the charge should consist of timber of uniform thickness, as otherwise the thicker blocks are not saturated throughout when the thinner have absorbed more than is necessary. The wood should not be seasoned, as it then absorbs the solution with greater difficulty, and the inner portions, even of plank and other stuff of moderate dimensions, may not be reached by the solution at all. Of the concentrated solution as received from the manufacturers, containing about 25 per cent. of the dry chloride, from 10 to 40 lbs. are taken up by 1,000 feet, board measure, or from about 2 to 8 ounces to a cubic foot. A method of burnettizing wood in open tanks, thus saving the expense of the costly apparatus now employed, is proposed by F. Hewson, C.E., in the "Journal of the Franklin Institute" for Jan. 1859.—Lime water has been recently employed in England for preserving wood, the timber being allowed to soak in tanks containing it. The lime is said to penetrate the pores of the wood, neutralizing the albuminous and saccharine principles. As the hydrate of lime changes after a time to the carbonate, the pores become filled with the stony product, and the effect is that of incipient petrifaction.

PRESIDENT (Lat. *præses*), an officer appointed or elected to preside over a tribunal, a company, an assembly, or a republic. The chief executive officer of the United States bears this title, and the second executive officer, the vice-president, is by virtue of his office the president of the senate, and succeeds to the office of president of the United States on the death or disability of the regular incumbent during his term. The chief executives of Mexico and the republics of Central and South America are also termed presidents. The president of the United States holds his office for the term of 4 years, beginning on the 4th day of March next succeeding the day of his election. He is chosen by electors who are themselves chosen by the people, and he must be a native of the United States and at least 35 years old. His powers are thus fixed by the constitution of the United States, article ii. section 2: "The president shall be commander-in-chief of the army and navy of the United States, and of the militia of the several states when called into the actual service of the United States; he may require the opinion in writing of the principal officer in each of the executive departments, upon any subject relating to the duties of their respective offices, and he shall have power to grant reprieves and pardons for offences against the United States, except in cases of impeachment. He shall have power, by and with the consent of the senate, to make treaties, provided two thirds of the senators present concur; and he shall nominate, and, by and with the advice and consent of the senate, shall appoint ambassadors, other public ministers and consuls, judges of the supreme court, and all other officers of the United States, whose appointments are not herein otherwise provided for, and which shall be established by law; but the congress may by law vest the appointment of such inferior officers as they may think proper in the president alone, in the courts of law, or in the heads of departments. The president shall have power to fill up all vacancies that may happen during the recess of the senate, by granting commissions which shall expire at the end of their next session." Section 7 of article i. requires that every bill which passes congress must have the president's signature to become a law, unless, after he has returned it to congress with his objections, two thirds of each house shall vote in its favor. The president's duties, as determined by article ii. section 3, are to give to congress from time to time information of the state of the Union, and recommend to their consideration such measures as he shall judge necessary and expedient; to convene both houses on extraordinary occasions, and, in case of disagreement between them as to the time of adjournment, to adjourn them to such time as he shall think proper; to receive ambassadors and other public ministers; to take care that the laws be faithfully executed; and to commission all the officers of the United States. He can be removed from office on impeachment for and conviction of treason, bribery, or other high crimes and misdemeanors. The presidents of the United States from the adoption of the constitution till the present time have been 16 in number, viz.: George Washington (inaugurated April 30, 1789), John Adams, Thomas Jefferson, James Madison, James Monroe, John Quincy Adams, Andrew Jackson, Martin Van Buren, William Henry Harrison, John Tyler, James Knox Polk, Zachary Taylor, Millard Fillmore, Franklin Pierce, James Buchanan, and Abraham Lincoln (inaugurated March 4, 1861). Of these, five served two terms each, viz.: Washington, Jefferson, Madison, Monroe, and Jackson; two died while in office, viz.: Harrison (April 4, 1841, one month after his inauguration) and Taylor (July 9, 1850, 16 months after inauguration); and the two who succeeded the last mentioned, Tyler and Fillmore, were elected as vice-presidents.

PRESS, Printing. See Printing.

PRESTER JOHN, the name given by Europeans in the middle ages to a supposed Christian sovereign or dynasty of sovereigns established in the interior of Asia. The name of this personage occurs first in the 11th century, and according to one account he was an eastern potentate dwelling beyond Persia, who, having been converted to Christianity by the spirit of a departed saint, caused his subjects to adopt the same faith. He was at once sovereign and priest of his people (whence his name Prester or Presbyter), and his sway, in its pastoral simplicity and benignity, was compared to that of kings in the patriarchal times. This story was subsequently found to be a mere Utopian fancy. The belief in the existence of Prester John, however, took a more tangible shape in the 13th century, and on the authority of some Nestorian priests he was said to be identical with Ung Khan, a powerful Tartar chief living in Karakorum, in eastern Tartary, who in 1202 was overthrown and slain by Genghis Khan. Giovanni Carpini, a Franciscan friar, who in 1246 was sent on a mission to Batoo Khan, the grandson of Genghis, failed to discover the Christian monarch or his subjects, but supposed him to be established further to the eastward. A few years later another Franciscan, Rubruquis, penetrated as far as the court of Batoo Khan in central Tartary, and was thence forwarded to Karakorum, the residence of Mangoo Khan, and the supposed seat of Prester John. His search for the latter was unavailing, but from a few Nestorian priests whom he met there, he ascertained that Ung Khan had encouraged the propagation of Christianity in his dominions. The existence of Prester John nevertheless continued to be believed, and as late as the close of the 15th century the Portuguese, who had reached India by the way of the cape of Good Hope, made fruitless inquiries for him there. About the same time Peres da Covilham, a Portuguese traveller, made a journey to Abyssinia in quest of the kingdom of Prester John; and finding the *negus* or king of Habesh to be a Christian prince, he conferred the title upon him, although it had never been claimed by that monarch. Mosheim, in his "Ecclesiastical Institutes," conjectures that Prester John may have been a Nestorian priest, who, gaining possession of a throne in eastern Tartary, transmitted his title as well as his name to his successors. Others have supposed him to be identical with the grand lama.

PRESTON, a N. W. co. of Va., bordering on Pennsylvania and Maryland, and intersected by Cheat river; area, about 600 sq. m.; pop. in 1860, 13,312, of whom 67 were slaves. It occupies a valley between the Chestnut ridge on the W. and the Alleghany ridge on the E., and the soil is very fertile. Iron ore, coal, sandstone, and slate are found, and extensive water power is afforded by the streams. The productions in 1850 were 144,276 bushels of Indian corn, 153,496 of oats, 36,769 of wheat, 7,765 tons of hay, 43,970 lbs. of wool, and 179,836 of butter. There were 4 tanneries, 1 woollen factory, 28 churches, and 840 pupils in public schools. Value of real estate in 1860, $2,980,604, showing an increase since 1850 of 155 per cent. It is traversed by the Baltimore and Ohio railroad. Capital, Kingwood.

PRESTON, a town of Lancashire, England, on the right bank of the river Ribble, 210 m. by railway N. W. from London; pop. in 1861, 69,542. It occupies an eminence rising from the river. A handsome railway viaduct feet high, spans the river. The staple manufacture of Preston was originally linen, which is still made to some extent, but has been completely eclipsed by cotton. There are more than 50 cotton mills, beside manufactories of worsted, machinery, &c. Vessels of 300 tons can ascend to the quays. Preston owes its name, originally Priests' Town, to the number of religious houses it contained. It returns members to parliament.

PRESTON. I. **William Campbell**, an American statesman and orator, born in Philadelphia, Dec. 27, 1794, died in Columbia, S. C., May 22, 1860. He was of a Virginia family, and his paternal grandfather, who married a sister of Patrick Henry, participated in the war of independence as colonel in the forces of that commonwealth. His own birth happened in Philadelphia during the temporary residence of his father there as a member of congress. In his 14th year he was sent to college at Lexington, Va., but being compelled by ill health to visit the South, he finished his education at the state college in Columbia, S. C., where he was graduated in 1812. Returning to Virginia, he commenced the study of the law with William Wirt, but after a few months was again compelled to travel for the benefit of his health. After an extensive tour through the valley of the Mississippi, he visited Europe, where he remained several years, and at the university of Edinburgh pursued his studies under Professors Playfair, Brown, and Irving. In 1819 he returned to Virginia, and in 1820 was admitted to the bar of that state. Two years afterward he transferred his residence to Columbia, S. C., and soon gained a reputation as a public speaker. In 1828, and again in 1830–'32, he was returned to the state legislature, and became one of the leaders of the nullification party. In 1836 he was elected to the U. S. senate; but differing with his colleague, Mr. Calhoun, and his constituents in regard to the support which they gave to Mr. Van Buren, he resigned his seat and resumed the practice of the law. He was thus engaged when in 1845 he was induced to accept the presidency of the South Carolina college. The institution had sunk somewhat in public esteem on account of the supposed lax views of religion entertained by its former president, Judge Cooper; and notwithstanding new professors had been introduced, and other reforms adopted by the trustees, the students were ill disciplined and frequently in open rebellion. On Mr. Preston's assumption of authority the college soon rose to a degree of prosperity un-own before. He held the office until 1851, en declining years and health prompted his tirement. He soon after established the Co-umbia lyceum, which he endowed with his rary, containing 3,000 selected volumes. As orator and a lawyer he held a distinguished ace among the public men of South Carolina, though his reputation in the former capacity terfered with his success at the bar. Judge 'Neall, in his "Bench and Bar of South Caro-na," testifies to his great abilities as a *nisi prius* wyer, and asserts that "his circuit speeches, pecially in criminal cases, were unsurpassed." is style was ornate and florid, his elocution raceful, and in his more elaborate productions e evinced a considerable knowledge of Eng-sh classical literature. II. JOHN S., brother f the preceding, born near Abingdon, Va., pril 20, 1809. He was educated at Hampden idney college and the university of Virginia, nd subsequently studied in the law school of arvard university. In 1830 he married a aughter of Gen. Wade Hampton of South Car-lina, and during the political excitement of hat period became an active nullifier. For a umber of years subsequent he was chiefly oc-upied with sugar planting in Louisiana, where e owned large estates, although he still re-ained his residence in Columbia, S. C. From 848 to 1856 he was a member of the South Carolina legislature, where he gained considerable reputation as an orator; and during the ame period he became more widely known in this capacity by addresses before the '76 association of Charleston, the literary societies of the South Carolina college, and particularly at the celebration of the 75th anniversary of the battle of King's Mountain, which was attended by 15,000 persons from North and South Carolina, Virginia, and Tennessee. From 1856 to 1860 he resided chiefly abroad, superintending the education of his children, and in 1860 he was elected a delegate to the national democratic convention which met in Charleston in May of that year to nominate a candidate for the presidency, and in which he acted as chairman of the South Carolina delegation. Subsequently he withdrew with his associates from the convention, and was not again a delegate. His course in participating in the proceedings of the convention at all, under the peculiar relations which South Carolina then sustained to such bodies, subjected him to severe censure; but having promptly joined the secession movement after the election of Mr. Lincoln, he was appointed a commissioner to Virginia, and upon presenting his credentials to the convention of that state in Feb. 1861, made an elaborate plea in favor of her immediate withdrawal from the Union, which is esteemed the crowning effort of his oratory. He has since occupied himself almost exclusively with his private business.

PRESTON PANS, a village in Haddingtonshire, Scotland, on the frith of Forth, 8½ m. E. of Edinburgh, where was fought a memorable action between the Scottish Jacobites under the Young Pretender and the royal troops under Sir John Cope, Sept. 21, 1745. The opposing armies came within sight of each other on the afternoon of the 20th, Cope occupying a strong position adjoining the village of Preston Pans, and having his front protected by a deep morass, while the pretender's troops, consisting mostly of highlanders, were posted on a ridge about a mile distant. The armies were nearly equal in numbers, the royalists having about 2,200 men, with 6 pieces of artillery, and the insurgents 2,500; but in appointments and discipline the former had decidedly the advantage, the highlanders being a hastily gathered rabble, without artillery or cavalry, indiscriminately armed with muskets, broadswords, scythes, or Lochaber axes, and kept together chiefly by enthusiasm for their cause and the expectation of plunder. Cope was urged to commence the engagement at once, instead of allowing the spirits of his men to be damped by remaining on the defensive, but declined; and at nightfall both armies lay in sight of each other. At midnight the pretender was informed that a path leading to the plain below and avoiding the morass had been discovered, and at a council of chiefs immediately summoned, it was determined to march at once to the attack. Under cover of the darkness and of a heavy mist the clans reached the plain in safety, where Cope's forces, alarmed by the firing of their outposts, were drawn up to receive them, the infantry occupying the centre, and either wing being protected by a regiment of dragoons, in front of one of which, Gardiner's, was the artillery. As the sun rose, the highlanders, who were formed in 2 lines, the 2d of which was led by the pretender, uncovered, and having uttered a short prayer, rushed with a terrific yell upon their enemy. The artillery, which was badly served by seamen collected from the fleet, instead of by regular gunners, was in a moment overpowered; and the dragoons in their rear, panic-stricken by the fierce shouts and the impetuous courage of their opponents, who, discarding their muskets after a single volley, threw themselves broadsword in hand upon the very muzzles of the guns, galloped away in all directions, heedless of the exhortations of their commander, Col. Gardiner. The other regiment of dragoons was scattered with equal rapidity, and the infantry, uncovered at both flanks, were, after a brief though brave resistance, completely routed. "So rapid was this highland onset," says Lord Mahon, "that in 5 or 6 minutes the whole brunt of the battle was over." Nearly all the royal infantry were killed or taken prisoners; but the dragoons, owing to the lack of troopers in the pretender's army, mostly escaped. Cope himself headed the fugitives, and scarcely drew rein until safe behind the walls of Berwick, where Lord Mark Kerr, the commandant, congratulated him upon being the first general on record who had carried the tidings of his own defeat. The humorous Scotch ballad, "Johnnie Cope," was suggested by the precipitate flight of the English general. Of the royal army nearly 400 were slain, including Col. Gardiner, a man of great worth and gallantry, who, after the flight of his dragoons, put himself at the head of a small party of infantry and was cut down by a highlander armed with a scythe. His life and character form the subject of a memoir by his friend Dr. Doddridge. The pretender lost about 100 men killed and wounded. The battle was called by the Jacobites that of Gladsmuir, out of respect to a passage in a book of prophecies printed in Edinburgh in 1615: "On Gladsmuir shall the battle be," although that place is a mile distant from the field of conflict. On the following day the pretender made a triumphal entry into Edinburgh, the pipers playing the old cavalier tune: "The king shall enjoy his own again."

PRESUMPTION, in law, an inference or assumption which the law makes in the absence of evidence. Presumptions are divisible into conclusive presumptions and disputable presumptions. Conclusive presumptions answer to the *præsumptio juris et de jure* of the civil law. The law asserts them to be true, and will not permit evidence to deny or refute them. A familiar illustration may be found in the rule that a debt which has run 20 years, whether under seal, or by judgment, or resting on other evidence, is conclusively presumed to have been paid. If it be sued one day before the 20 years expire, the creditor need only prove the debt, and the debtor must prove that he has in some way satisfied it. But if it be sued one day later, not only is the debtor relieved from the necessity of proving payment, but the creditor will not be permitted to prove that the debt has not been paid. If the creditor can prove any thing which the law would recognize as a new promise within 20 years, the suit may be maintained on this new promise, but the old debt is conclusively settled. Another common instance is the rule in respect to land, possession of which under a claim of absolute ownership for a certain period constitutes a conclusive presumption of a valid grant, which cannot be disturbed by evidence. This period is now, in the United States, generally 20 years; but in some it is much less, and in others extends to a longer period. (See PRESCRIPTION.) These presumptions rested originally on the probability that they were true, but came at last to stand upon the ground that the peace of society and the possession of property should be protected against stale claims, which, after being suffered to sleep so long, cannot be revived and prosecuted without working an injury. The presumptions arising under all the statutes of limitation may be considered as of this class; and we have already stated the general principles applicable to these presumptions, and the way in which, from being regarded as statutes founded on probability, they came to be considered and treated as statutes of repose. (See LIMITATION, STATUTES OF.)—Conclusive presumptions are not very common in the law. But disputable or rebuttable presumptions, answering to the *præsumptio juris* of the civil law, constantly occur. They are indeed no more than legal inferences from existing evidence, open to modification or reversal by further evidence. They are much the same as *prima facie* conclusions or inferences; as, for example, when one sues a promissory note and proves his own possession and the signature of the maker, the law presumes the plaintiff to be the owner of the note, and also presumes consideration, and gives the plaintiff his case, unless the defendant overcomes the presumption by evidence on his part of some ground of defence. The general presumption of innocence in favor of an alleged criminal, and of absence of debt in favor of a defendant in a civil suit, are of this kind. It will be seen therefore that disputable presumptions do no more than determine where the burden of proof rests.

PRETENDER, an epithet applied to the eldest son and grandson of James II., who laid claim to the throne of England. (See JAMES FRANCIS EDWARD STUART, and CHARLES EDWARD.)

PRÉVILLE, the assumed name of PIERRE LOUIS DUBUS, a French comedian, born in Paris in 1721, died in Beauvais, Dec. 18, 1799. After having performed at many provincial theatres, he appeared at the *théâtre Français* in Paris in 1753, and was the favorite of the Parisian public for 33 years. His best parts were Sosia in Molière's *Amphitryon*, Turcaret in Le Sage's comedy of that name, La Rissole in Boursault's *Mercure galant*, and Figaro in Beaumarchais's *Barbier de Séville* and *Mariage de Figaro*. From memoranda which he left, M. Cahaisse composed his *Mémoires* (Paris, 1813).

PRÉVOST D'EXILES, ANTOINE FRANÇOIS, a French novelist, born at Hesdin, Artois, April 1, 1697, died near Chantilly, Nov. 23, 1763. He was intended for the church and educated at a Jesuit college, but in his 16th year entered the army. Soon returning to the college, in a few months he ran away again, and for 4 or 5 years led a very dissipated life. At the age of 22 he sought admission among the Benedictines of St. Maur, took the vows in 1721, was ordained priest, and proved a successful preacher. Being sent to the abbey of St. Germain des Prés, he shared in the historical and literary labors of the learned monks, and in the meantime diverted his mind by writing novels. Unable to support the austerities of the convent, he desired to be removed to a less severe branch of the same order; but the issuing of the brief of translation which had been granted to him by the pope being unaccountably delayed, he abandoned the order altogether in 1728, and went to Holland, where he supported himself by his pen. Having published *Mémoires d'un homme de qualité* (6 vols. 12mo., 1729), he went to England, where he published *Cleveland* (6 vols. 12mo., 1732), and *L'histoire de Manon*

caut et du chevalier des Grieux (1733). The
named work is supposed to be a slightly
guised account of the author's own experience,
ranks as one of the best of French novels.
1754 he was permitted to return to France
appointed almoner to the prince of Conti.
now wrote *Le doyen de Killerine* (6 vols.,
40), published a French translation of Cicero's
ters Ad Familiares (1745), undertook a *His-*
re générale des voyages, which he carried for-
ed to the 80th volume, and translated into
nch Richardson's "Pamela," "Clarissa Har-
ve," and "Sir Charles Grandison." In his
er years he led a quiet religious life at St.
ymle, near Chantilly. Having fallen in a fit
apoplexy, he was supposed to be dead, and
topsy was ordered. The first stroke of the
ife restored him to consciousness, but it had
licted a mortal wound. His complete works
prise more than 170 volumes. His *Œuvres*
isies were published in 39 vols. 8vo. (Paris,
83–'5), and reprinted in 1810, with illustra-
ns. The *Histoire générale des voyages* was
ridged and continued by La Harpe.

RIAM, the last king of Troy, and according
he legend 5th in descent from Jupiter. He
s the son of Laomedon, and in his youth was
en prisoner by Hercules. Previous to this
had been called Podarces, the swift-footed;
he was now bought from Hercules by his
er Hesione, and was thence called Priamus,
the ransomed. According to Homer he had
children, Hecuba alone having borne him
; among them were Hector, Paris, Helenus,
iphobus, Polyxena, Cassandra, and Creusa.
ring the sack of Troy by the Greeks he was
in at the foot of an altar by Pyrrhus.

PRIAPUS, in Greek and Roman mythology,
type of fecundity, son of Bacchus and Venus.
cording to different Greek and Roman poets,
was the son of Bacchus and a Naiad, or of
lonis and Venus, or of Mercury or of Pan.
e was generally represented in the form of
rms, or a head placed on a quadrangular pil-
r, and painted red. His emblem was the
allus, and bearing this his image was placed
gardens and vineyards.

PRICE, Richard, an English divine and
oralist, born in Tynton, Glamorganshire, Feb.
, 1723, died in London, April 19, 1791. The
n of a dissenting Calvinistic minister, he
as educated under private clerical tuition,
d in his 18th year he went to London to
mplete his preparation for the ministry.
s uncle obtained for him admission into a
senting academy, where for 4 years he
udied mathematics, philosophy, and theology.
1743 he became domestic chaplain to Mr.
eathfield of Stoke Newington, in which
ice he remained 13 years, at the same time
eaching occasionally. The death of his uncle
t him a small fortune, and he married in
57, and became morning preacher in New-
ton Green chapel. He was afterward ap-
inted pastor of the Gravelpit meeting, Hack-
y, and afternoon preacher at Newington Green, both of which offices he resigned a short time before his death. In 1757 he published his "Review of the Principal Questions and Difficulties in Morals," an attempt to found moral obligation on intellectual instead of sentimental tests. Reason alone, he says, did we possess it in a higher degree, would answer all the ends of the passions. In 1769 he published a treatise on reversionary payments, drawing attention to the defective principles adopted by several societies designed to secure annuities to surviving widows, which resulted in their dissolution or modification; the 5th edition appeared in 1803. He published in 1776 his "Observations on Civil Liberty and the Justice and Policy of the War with America," of which 60,000 copies were soon distributed. The American congress afterward invited him, through their commissioners, to become a citizen of the United States, and to aid them in managing their finances, promising him a liberal remuneration if he should remove to America. He declined the request, at the same time speaking of the United States as the hope and the future refuge of mankind. He was an admirer of Plato, and a firm believer in the immateriality of the soul. He is the author of various works on religion, ethics, politics, and finance. His biography was written by William Morgan, D.D. (London, 1815).

PRICE, Sir Uvedale, an English writer on landscape gardening, born in 1747, died in Foxley, Herefordshire, Sept. 11, 1829. He was educated at Oxford, and in 1780 first appeared in print as the translator of Pausanias, in a work entitled "An Account of the Statues, Pictures, and Temples in Greece." His fame rests chiefly upon his "Essay on the Picturesque, as compared with the Sublime and Beautiful, and on the Use of studying Pictures for the purpose of improving Real Landscapes" (1794), which brought him into conflict with Repton, then a prominent landscape gardener. To his criticism Price replied in 1795, in "A Letter to H. Repton, Esq., on the Application of the Practice as well as the Principles of Landscape Painting to Landscape Gardening." In 1828 he was made a baronet.

PRICHARD, James Cowles, M.D., an English ethnologist, born in Ross, Herefordshire, Feb. 11, 1786, died in London, Dec. 22, 1848. He was graduated M.D. at Edinburgh, and settled as a physician in Bristol in 1810, but devoted his leisure to ethnological studies. In 1813 he published his "Researches into the Physical History of Man," and in 1826 a second and greatly enlarged edition of it, in which he developed for the first time to its full extent the philological element in ethnology. In 1841 he was appointed inspector of lunatic asylums, and removed to London, where in 1847 he brought out the third edition of the "Researches" (5 vols. 8vo.), comprising the results of 37 years' study. He is also the author of various professional works, a *résumé* of his "Physical History," "Natural

History of Man" (2 vols., 1848), and what is called by Bunsen his most original contribution to science, "The Eastern Origin of the Celtic Nations" (London, 1831; new ed. by Latham). Dr. Prichard's position as an ethnologist was one of eminence in Europe; the same writer (Baron Bunsen) says of his great work: "Up to this time there exists no book which treats all subjects bearing on the great question of the unity of the human species with equal depth and candor, good sense, and sound judgment."

PRICKLY PEAR. See CACTUS.

PRIDE OF INDIA, PRIDE OF CHINA, or NEEM TREE (*melia azedarach*, natural order *meliaceæ*), a native of Syria, Persia, and the north of India, and cultivated in different parts of the world as an ornamental tree. It grows to the height of 30 or 40 feet with a trunk of 20 inches diameter; but in open spaces it is spreading and not so high. Its leaves consist of smooth, pointed, dark green leaflets, arranged in pairs with an odd one at the end. The flowers, hanging in clusters at the ends of the branches, are of lilac color and agreeable perfume. They give place to bunches of berries about as large as cherries, and yellow when ripe. The pericarp has afforded an oil for economical purposes. The fruit is sweetish, and is generally supposed to be poisonous, but it may be eaten with impunity. In the cities of the southern states and upon many of the plantations rows of pride of India trees are very common, and in the autumn the branches and the ground beneath are covered with their berries. The tree has some reputation for its medicinal virtues, and a decoction of the bark of the root is administered as a cathartic and emetic. It is considered in many places an excellent remedy for worms, and is much used for children. In large doses it is said to produce narcotic effects, and such appears to be the action of the ripe berries upon the robin redbreasts, which are very fond of them, and eat them until they become stupefied and fall to the ground. From this state however they soon recover.

PRIDEAUX, HUMPHREY, an English clergyman and author, born in Padstow, Cornwall, May 3, 1648, died Nov. 1, 1724. He was educated at Westminster under Dr. Busby, and at Christchurch, Oxford, and assisted Dr. Fell in preparing an edition of the historian Lucius Florus. Having been selected by the university to edit the inscriptions of the Arundelian marbles, he published them in 1676 after two years' labors, under the title of *Marmora Oxoniensia ex Arundellianis, Seldenianis, aliisque conflata, cum perpetuo Commentario.* In 1679 he was presented by Lord Chancellor Finch to the rectory of St. Clement's, Oxford, was appointed the same year Dr. Busby's Hebrew lecturer in Christchurch, and published two tracts of Maimonides in the original with a Latin translation and notes, under the title *De Jure Pauperis et Peregrini apud Judæos.* In 1681 he was made a prebendary of the ca dral of Norwich, where he had a contro with the Roman Catholics, which resul his publishing a book entitled "The Val the Orders of the Church of England ma He opposed James II. in his proceedings a the established church, and, having bee pointed to the archdeaconry of Suffolk after some hesitation the oath of allegia William and Mary. In 1696 he was ma car of Trowse, near Norwich, and in 17 of Norwich. He was the author of a of Mahomet" (1697), "Directions to C Wardens" (1707), and a work on "T (1710); but his last and greatest wor "The Connection of the History of the and New Testaments," which appeared parts in 1715 and 1717 (last ed., 1858).

PRIESSNITZ, VINCENZ, a German pe the founder of the water cure, born in G berg, Austrian Silesia, Oct. 4, 1799, died Nov. 28, 1851. His father was a farmer Vincenz, after receiving the rudiments education, was required to work on the It was through an accident which hap to him while thus engaged, that he was brought to employ the cure which he s quently systematized. He then studied cine, and opened his cold water establis at Gräfenberg in 1829. (See HYDROPATHY

PRIEST, a person set apart for the per ance of religious offices and ceremonies, a particular for the performance of sa History shows the priestly office to be coextensive with religion itself, and har barbarous tribe has been discovered wit some sort of priests to guide the people in worship of their deity. The Old Tes contains but little information concerni exercise of priestly functions before the p gation of the law of Moses. We read tha and Abel offered their own sacrifices; seems that the priestly office soon came exercised by the heads of families onl Abraham, Isaac, Jacob, and Job. The priest, however, is not used respecting them; it occurs only once in the book of Ge when Melchisedek is called a priest of the High, but nothing is added to define the na of his priesthood. The Mosaic law estab a special priesthood consisting of three the high priests, the priests, and the Le all of them taken from one tribe, that of L The priesthood was made hereditary in family of Aaron; and the first born of th est branch of that family, if he had no blemish, was always the high priest. Th pointment was observed till the Jews fell the dominion of the Syrian Greeks, and their faith corrupted; then and afterward the Romans the high priesthood was some put up to sale, and became a temporary In the time of David the inferior priests w divided into 24 companies, serving in rota each company by itself for a week.—The history of the priesthood of the several religions is still involved in great obscurity, though elucidated in many important details by modern criticism. With most of the uncivilized tribes the priest had a very limited sphere of action; he generally appears as a sorcerer, who derives by communication with a spirit world the command of magic powers for the relief of the distressed and suffering. With some tribes the power of sorcery seems to have been the only attribute of the priesthood; with others they were also clothed with the office of divining, and with that of offering sacrifices. In the Society islands and New Zealand the priesthood formed a hereditary corporation; but nowhere among pagan tribes have they been so powerful and numerous as in Mexico, where they are said to have numbered 4,000,000 at the arrival of the Spaniards. —The idea of priesthood was much more fully developed by Brahminism. The Brahmins have assigned to them the primacy of honor among the 4 castes, and it is easy to trace in the enormous prerogatives with which they are clothed the fundamental idea of a vicegerency of God upon earth, for the purpose of conveying to mankind the divine blessings. Brahmins are also charged with preserving the soundness of doctrine, and with presiding over sacrifices and divine services.—The rationalistic state church of China, which owes its final organization to Confucius, has no special priesthood, but the priestly functions are blended with those of the emperor and the subordinate state officers. The Buddhist priests, called lamas in Mongolia and Thibet, bonzes in Japan, rahans in Burmah, talapoins in Siam, and gunnis in Ceylon, are essentially spiritual guides. They are to be examples of a perfect life, consisting, according to Buddhist views, in overcoming matter, accumulating merits, and thus preparing for a higher second birth. They do not form a caste; they live in celibacy, and their chief, the dalai lama, is regarded as the incarnation of Buddha himself. (See LAMAISM.) The magi of the Persians were the conductors of religious services and the teachers of the people. In Egypt the priests likewise formed one of the supreme castes, endowed with many privileges, and in particular exempted from paying taxes. Being divided into several classes, they constituted a complete hierarchy, on a democratic basis, with a chief priest, Pyromis, at their head. More than any other pagan priesthood, they distinguished themselves as the teachers and educators of the people, and secured the continuance of their prerogatives by keeping up their literary superiority. The ancient religion of the Greeks had no general priesthood, but only priests of the several deities, who slaughtered the victims, and often secured a powerful influence as the interpreters of the will of the deity which they served. Finally the priestly office among them fell into utter insignificance. The Roman priesthood was to a larger extent than that of any other great nation of antiquity charged with the office of divining. It was a well organized and largely privileged state institution, which knew how to retain its social position and political influence, when the belief in its faculty of divining had entirely ceased among the educated classes, and when, as Cicero says, he wondered how two augurs could meet without laughing at each other.—In the Christian system the gospel represents Christ as the one priest, who, for the redemption of the world, offered the one sacrifice, that of the cross. So far all who receive the record of the gospel as infallibly true agree; but there is a fundamental difference of opinion on the question, whether this sole priesthood of Christ is or is not incompatible with the existence of a proper priestly office in the church. The Roman Catholic church, and those eastern churches (Greek, Armenian, Nestorian, Jacobite, Coptic, Abyssinian) which regard ordination as a true sacrament, maintain that the sacrifice of the cross was to be continued and kept present in the church through appointed representatives and vicegerents of Christ, who for that purpose continue and partake in the priestly character of Christ and his mediatorial office between God and man. (See ORDINATION.) The other Christian denominations deny that there is in the Christian church any other real priest than Christ, since there is no one after Christ who has the power of offering sacrifices for the people. But they believe, on the other hand, in a spiritual priesthood of all Christians, which they derive from their union with Christ, the sole high priest. They therefore do not regard the clergy as an order of men specifically distinct from the laity, but only as the body of the teachers and servants of the church, who, being divinely called and properly appointed, possess certain ecclesiastical rights and undertake certain duties, which they derive partly from divine, partly from human law. (See CLERGY.) The Protestant Episcopal churches of England, Scotland, Ireland, and America have retained the word priest, to denote the second order of their hierarchy, but with very different significations, according to the different opinions entertained by the members of those churches respecting the Lord's supper.

PRIESTLEY, JOSEPH, an English theologian and natural philosopher, born in Fieldhead, in the west riding of Yorkshire, March 13, 1733, died in Northumberland, Penn., Feb. 6, 1804. He was the son of a cloth dresser, and both of his parents, and also an aunt by whom he was adopted after his mother's death, were Calvinistic dissenters. Early remarkable for his love of reading and study, he was designed by his friends for a learned profession, and was instructed in the classics in a free grammar school. He learned Hebrew in his holidays under a dissenting minister, and with little instruction made progress in the Chaldaic, Syriac, Arabic, French, Italian, and German. His mother had deeply impressed him with religious and moral sentiments, and even in boyhood his seriousness bordered upon melancholy, condering him averse to boyish sports and light reading. Though obliged by ill health to abandon his studies for a time, he entered at the age of 19 the dissenting academy at Daventry (now incorporated with New college, London) as a theological student. It was then under the care of Mr. Ashworth, successor of Dr. Doddridge. He formed the strictest habits in the methodical division of his time and labor; noted in a diary the occurrences of every day, the books which he read, and the reflections suggested; arranged at the beginning of every year his plan of study for the whole period, and at the close took an account of what he had done, compared it with what he had purposed, and struck the balance with a merchant's exactness. He had become an Arminian before leaving home, and on account of his doubts concerning orthodoxy had not been admitted a communicant of the Calvinistic church. Theological doctrines were constantly discussed at Daventry, and he usually defended the heterodox side, though, he says, the extreme of heresy in the place was Arianism. While at the academy he composed the first part of his "Institutes of Natural and Revealed Religion," published in 1772–'4. In 1755 he was invited as assistant minister to the Independent congregation in Needham Market, Suffolk, where he remained 3 years, suspected of heresy and not popular either as a preacher or teacher. He there renounced the doctrine of the atonement, and wrote his "Scripture Doctrine of Remission," published in 1761. His second engagement was at Nantwich, Cheshire, where he opened a day school, and by strict economy was able to purchase an air pump and electrical machine, with which he began his researches in natural philosophy. His reputation for ability and diligent investigation gradually extended, and in 1761 he was chosen to succeed Dr. Aikin as professor of belles-lettres in Warrington academy. He married, and composed several works, as the "Theory of Language and Universal Grammar" (1762), "Chart of Biography" (1765), "Essay on a Course of Liberal Education for Civil and Active Life" (1765), "Chart of History" (1769), "Laws and Constitution of England" (1772), "Oratory and Criticism" (1777), and "History and General Policy" (1788). During the same period he was interested in general politics, on which he delivered lectures. On a visit to London he was introduced to Dr. Price, Dr. Franklin, and others, and was advised by Franklin to attend more particularly to experimental philosophy. He undertook to write a history of electrical discoveries, for which Dr. Franklin furnished him the requisite books; the work was published, with an account of many experiments by himself, in 1767; it reached its 5th edition in 1794, though rapidly and carelessly written amid other engagements. In 1768 he was chosen pastor of a large congregation in Leeds, where he devoted much of his attention to theological subjects. About the same time he was elected to the royal society, and received the title of LL.D. from the university of Edinburgh. In 1772 appeared his "History and Present State of Discoveries relating to Vision, Light, and Colors," which proved less successful than his "History of Electricity." A brewery near his residence suggested to him the study of pneumatic chemistry, which he prosecuted with great interest, published a pamphlet on "Impregnated Water with Fixed Air" (1772), and received from the royal society the Copley medal for "Observations on the Different Kinds of Air" (1773). He discovered oxygen gas, which he named dephlogisticated air; showed that the red color of the arterial blood is due to its combination with oxygen from the atmosphere; proved the abstraction of oxygen from the atmosphere in the processes of combustion and putrefaction; and recognized the property of vegetables to restore this constituent. He adhered to the phlogistic theory after Lavoisier had overthrown it by further investigation. He discovered also nitrous gas, nitrous oxide gas, nitrous vapor, carbonic oxide gas, sulphurous oxide gas, fluoric acid gas, ammoniacal gas, and muriatic gas; and he was the principal inventor of the pneumatic trough. He received an advantageous proposal to accompany Capt. Cook on his second voyage to the South sea, which was however withdrawn in consequence of his religious principles. His name as a man of science was now honored throughout Europe, and the recommendation of Dr. Price made him favorably known to the earl of Shelburne, who engaged his services as librarian and literary companion. He accompanied the earl on a journey to the continent, and was introduced to some of the most celebrated chemists and mathematicians, whom he described as atheists, and whom he astonished by asserting his firm belief in Christianity. As an answer to similar prejudices he wrote his "Letters to a Philosophical Unbeliever" (1780), and his "State of the Evidence of Revealed Religion," with animadversions on Gibbon (1781). He continued his chemical experiments, making discoveries concerning aëriform bodies, which he reported in his "Experiments and Observations on Air" (5 vols., 1774–'80). He published in 1775 his "Examination" of Drs. Reid, Beattie, and Oswald, designed to refute the Scotch philosophy of common sense; in 1777, his "Disquisitions relating to Matter and Spirit," a defence of avowed materialism, which was more obnoxious than any other of his writings; and in the same year his "Doctrine of Necessity," of which also he became the champion. The odium occasioned by these works was perhaps the cause of the dissolution of his connection with Lord Shelburne; and he retired with a pension for life of £150. He took up his residence near Birmingham, where in 1780 he became pastor of a dissenting congregation. At the same time a subscription was raised by his friends to defray the expenses of his experments. In 1782 appeared his "History of the Corruptions of Christianity," which was afterward burned by the common hangman in the city of Dort, and a refutation of which was one of the subjects of the Hague prize essays; and in 1786 his "History of Early Opinions concerning Jesus Christ." In each of these works the divinity and preëxistence of Christ are controverted on historical grounds. During the excitement caused by the outbreak of the French revolution he was regarded as the mover and champion of antagonism to all establishments, political and religious. His attachment to freedom he had evinced by several pamphlets and by his interest in the cause of America during the war of the revolution; and he had published several volumes in maintenance of the claims of dissenters. He exasperated the populace by his ironical "Familiar Letters to the Inhabitants of Birmingham," and by answering Burke's "Reflections," and being consequently nominated a citizen of the French republic. In 1791 some of his friends celebrated the anniversary of the capture of the Bastile; and though he was not present himself, the event was the occasion of a riot in which his house was broken open, his library, apparatus, and manuscripts destroyed, and himself obliged to flee from the place with his family. His books were strewn over the high road for half a mile; the scraps of the manuscripts covered the floors several inches deep; and finally it was unsuccessfully attempted to set the house on fire. He received ample remuneration from the country and chiefly from private benevolence, and removed to Hackney to succeed Dr. Price; but noticing that his society was avoided even by his philosophical associates, and despairing of any further tranquillity in England, he resolved on emigration to America. He arrived in New York June 4, 1794, was received with distinction, took up his residence in Northumberland, Penn., where his son had an agricultural settlement, and soon established himself in his old habits, busily writing and experimenting. He was offered the professorship of chemistry in the university of Pennsylvania, but declined it. He delivered two courses of public lectures in Philadelphia in 1796 and 1797 on the "Evidences of Revelation," which were published and dedicated to John Adams, who was one of his auditors. He wrote and published in America his "Continuation of the History of the Christian Church from the Fall of the Western Empire to the Present Times" (4 vols., Northampton, 1803), which was dedicated to Jefferson, and also several minor theological works, among which were answers to Volney's and Paine's attacks on revelation. He never completely recovered from an illness in Philadelphia in 1801, but he continued to write diligently till near his death. In 1803 he asked his physician if he could prolong his life 6 months, adding that in that time he could complete all the works on which he was engaged. In his last illness he dwelt upon the happiness of his life, since he had enjoyed the friendly acquaintance of some of the best and wisest men of his age; and his death was so calm that it was not noticed by those who were sitting nearest to him. His *éloge* was read before the French institute by Cuvier. He was remarkable for philosophic serenity of character, for patience and zeal in public life, and for kindness in domestic relations. His "Doctrines of Heathen Philosophy compared with those of Revelation" appeared posthumously. His autobiography, continued by his son, was also published in America posthumously, and is contained with his correspondence in the edition of his "Theological and Miscellaneous Works" published by John Towell Rutt (25 vols., Hackney, 1817 *et seq.*).

PRIESTS OF THE MISSION, or **Lazarists**, a congregation of regular clerks, founded at Paris in 1625, by St. Vincent de Paul, for the purpose of ministering to the spiritual wants of the poor. While Vincent was residing with the count de Joigny, the father of Cardinal de Retz, he spent much of his time in preaching to the peasantry on his patron's estate, and effected so much good that the countess became desirous of founding a regular company of missionaries to engage in similar labors. In concert with her husband she obtained in 1624 from the count's brother, Jean François de Gondi, archbishop of Paris, a grant for this purpose of the *collège des bons enfants*. She endowed the projected congregation with the sum of 40,000 livres, and having persuaded Vincent to undertake the direction of it, the enterprise was put into execution the following year. The associates at first were but 2 in number, and when the deed of foundation was signed in Sept. 1626, they had only increased to 4. In May, 1627, Louis XIII. issued letters patent confirming the foundation, and in 1632 the missionaries were erected into a congregation by Pope Urban VIII. under the title of "Priests of the Congregation of the Mission." In the same year Adrien Le Bon, prior of St. Lazarus, a house of the canons regular of St. Augustine in Paris, placed them in possession of his priory, from which they have been popularly known as Lazarists. Their first establishment in Rome was made in 1642. In 1643 they were introduced into the Barbary states, in 1646 into Ireland, and in 1648 into Madagascar. The congregation was established in the United States in 1817. The priests of the mission devote themselves especially to the laboring classes, and it was stipulated in the original deed of endowment that they should "neither preach nor administer any sacrament in cities which are the seats of bishops, archbishops, or of courts of justice, except in cases of extreme necessity." They receive no compensation for their ministerial offices. Auxiliary to their personal labors for the poor are their institutions for the education and improvement of the clergy. Very soon after their foundation the direction of a number of ecclesiastical seminaries in France was committed to them, and they have ever since been actively employed in teaching candidates for the priesthood wherever they have been established. They also have houses to which priests may retire from the world for religious exercises, called "spiritual retreats." The priests of the mission take the usual monastic vows of poverty, chastity, and obedience. In 1860 the congregation had 15 houses in France, 28 in Italy, 6 in Germany, 1 in Great Britain, 1 in Spain, 17 in Turkey, Persia, and Abyssinia, 11 in the United States and 4 in other countries of America, 5 in Poland, 2 in Algeria, 1 in Cuba, and 1 on the Philippine islands; beside which, they have in China the entire ecclesiastical administration of 5 dioceses or vicariates apostolic.

PRIESTS OF THE ORATORY, or Oratorians, a religious society founded by St. Philip Neri. Going to Rome in his 19th year, in order to pursue his theological studies, Neri established there soon after a "Brotherhood of the Holy Trinity," to assist him in visiting the hospitals and prisons, and laboring for the conversion of sinners. The brotherhood assembled once a month, and the founder prescribed for them certain religious exercises. After they had been joined by several persons of high rank, they determined to build a large hospital to entertain during 3 days all poor pilgrims who came to Rome in order to pray at the tombs of the apostles, martyrs, and saints. This hospital was completed in 1558, and in the same year Pope Paul IV. presented to the association the church of St. Benedetto, now the church of the Holy Trinity. After having been ordained priest (1551), Neri associated with himself several young priests, and gradually matured the plan of the "Congregation of the Oratory." One of its first members was the celebrated Baronius. The congregation was formally established in 1564, confirmed in 1575 by Pope Gregory XIII., and again by Paul V. in 1612. During the lifetime of Philip the congregation extended through all parts of Italy, new houses being established at Florence, Naples, Lucca, Padua, and many other places. Neri remained the superior of the congregation until 1593, when he resigned, and was succeeded by Baronius. The congregation was almost always confined to Italy; but in recent times a flourishing branch has been established in England, nearly all the members of which were formerly clergymen of the church of England. They have there two establishments, at London and Birmingham, and among their members John Henry Newman and F. W. Faber are best known. At the beginning of 1860 they had 41 houses in Italy, 1 in Dalmatia, 2 in Spain, 1 in Poland, 9 in Mexico, and 1 in the island of Ceylon.—The French Oratorians, or the congregation of the Fathers of the Oratory of Jesus, were founded in 1611 by the abbé (afterward cardinal) Bérulle, and confirmed by a bull of Paul .V., May 10, 1613, under the name of "Priests of the Oratory of Jesus." Their aim was the restoration of ecclesiastical discipline among the clergy. They spread rapidly in France and elsewhere, and during the lifetime of their founder houses were established in Madrid, Rome, and Constantinople, and in Savoy and the Netherlands. The congregation soon became distinguished for the great number of eminent scholars among its members, such as Thomassin, Malebranche, Massillon, Morin, and Richard Simon. They became deeply involved in the Jansenist controversy, and at the elections of several superiors general they were divided into a Jansenist and an anti-Jansenist party. After the outbreak of the French revolution a considerable number of Oratorians joined the constitutional church. The congregation itself with all other religious associations, was dissolved. After the reëstablishment of the Bourbons, the Oratorians reorganized themselves, but in 1860 they had only one establishment, which was in Paris.

PRIMATE, a title of honor given to certain archbishops, and generally designating the chief archbishop of a country or district, who possesses a superiority of power or dignity over the other archbishops or bishops. In the Anglican church, the archbishop of York is styled primate of England, and the archbishop of Canterbury primate of all England, the archbishop of Dublin primate of Ireland, and the archbishop of Armagh primate of all Ireland.—In the Roman Catholic church, the primatial see of Ireland is Armagh, of Spain Toledo, of Portugal Braga, of Germany Saltzburg, of Hungary Gran, and of Poland Gnesen. In France 6 archbishops have received the title of primate, viz.: those of Lyons, Sens, Bourges, Bordeaux, Arles, and Vienne; but the dignity there is now merely titular. In the United States there is no primate, though the archbishop of Baltimore has an honorary precedence of all other Roman Catholic archbishops in this country.

PRIMATICCIO, Francesco, an Italian painter, born in Bologna in 1490, died in Paris in 1570. His first instructions in painting were derived from Innocenzo da Imola and Il Bagnacavallo, two Bolognese artists, and he subsequently passed 6 years at Mantua in the school of Giulio Romano, whom he assisted in the frescoes in the Palazzo del Te. Francis I. of France having commissioned the duke of Mantua to send him an artist to decorate the royal chateau at Fontainebleau, Primaticcio was selected for the purpose, and in 1531 repaired to the French court. The remainder of his life was passed in the service of Francis and his successors Henry II., Francis II., and Charles IX. His chief work in France was the series of frescoes at Fontainebleau representing scenes from ancient mythology and the Odyssey, in the execution of which he was assisted by his pupil Nicolo dell' Abati. The greater part of them were destroyed in 1738 to make way for some alterations in the chateau. Primaticcio was one of the most facile and inventive of the followers of Raphael.

PRIME. I. SAMUEL IRENÆUS, D.D., an American clergyman, born in Ballston, Saratoga co., N. Y., Nov. 4, 1812. He entered Williams college, Mass., at the age of 13, was graduated in 1829, and, after a course of study at the Princeton theological seminary, entered the ministry of the Presbyterian church. In 1840, being compelled by ill health to relinquish the active duties of his profession, he assumed the editorial charge of the "New York Observer" newspaper, one of the chief organs of his denomination, and his connection with which has continued to the present time. His contributions to this publication signed "Irenæus" have had considerable popularity, and under his management the "Observer" has become one of the leading religious periodicals in the country, beside acquiring a reputation for the conservative character of its political views. Dr. Prime is the author of "Travels in Europe and the East" (2 vols. 12mo., New York, 1855), and a work on Switzerland, the results of an extended journey in 1853, and of several works of a religious character, including "Thoughts on the Death of Little Children" and "The Power of Prayer," the latter of which, a sketch of the Fulton street (New York) prayer meeting, has been republished in several European languages. II. WILLIAM COWPER, brother of the preceding, an American author, born in Cambridge, Washington co., N. Y., Oct. 31, 1825. He was graduated at Princeton college, N. J., in 1843, and subsequently became a member of the bar in the city of New York, where he has continued until the present time, engaged in literary pursuits and the practice of his profession. Among his miscellaneous publications are "The Owl Creek Letters," consisting of papers originally contributed to the New York "Journal of Commerce;" "The Old House by the River" (12mo., 1853); and "Later Years" (1854). In 1855–'6 he travelled extensively in the East and elsewhere, and published upon his return "Boat Life in Egypt and Nubia" (12mo., 1857), and "Tent Life in the Holy Land" (12mo., 1857). He has since devoted much attention to numismatics and Egyptian antiquities, and in 1860 he edited a work entitled "Coins, Medals, and Seals" (4to.).

PRIMOGENITURE, a rule of law which confers a dignity or estate in lands on a person in virtue of his being the eldest male of those who would inherit. A preference of sons to daughters was a feature common to many of the ancient systems of law; but few or none of them recognized what in our time is meant by the custom of primogeniture. Among the Jews, the first born son as such received a double portion of his father's estate. If a Greek father died intestate leaving daughters only, his property went to his nearest kinsman. His will, if in such a case he made one, passed his estate not to his daughters, but to their future husbands. The earlier Roman law excluded daughters from the inheritance. Justinian first admitted them to share equally with their brothers. The Mohammedan law gave something to daughters, but allowed a twofold share to sons. The states of Europe which, after the decline of the Roman empire, made the later Roman law the basis of their jurisprudence, did not find in that code the doctrine of primogeniture. In France, for example, all historical evidences show that under the first two races of kings, at least, the eldest son shared equally with his brothers. Especially and certainly is this true of the succession to the crown in those reigns, where most naturally the custom of primogeniture would have been enforced if it had at all prevailed. It was not until the Capets came to the throne that the prerogative of succession to the crown was reserved exclusively to the first born. The lords promptly imitated the kings, and secured their fiefs to their eldest sons, and thus founded in France the *droit d'aînesse*. Whatever may have been in any country the immediate origin of primogeniture, the custom was no doubt everywhere the peculiar policy of the feudal system. To make certain and efficient the render of military service, which was at once the cause and consideration of the grant of feuds (or fees), it was expedient to render these indivisible. The fittest successor to the original holder, as being the one first capable of doing military duty, was the eldest son; and to him accordingly the feudal law quite invariably transmitted the father's lands. —It is possible, perhaps probable, that in England, before the Norman conquest, the custom still prevalent in Kent, and known as gavelkind, extended over the whole island. In virtue of this custom, the lands of one who died intestate, leaving sons and daughters, descend in equal divisions to the sons, exclusive of the daughters; but if he leave no sons, then the daughters share alike. But whatever be the truth in respect to this matter, certainly the conquest introduced the policy and rules of the continental feudal system, and thus prepared the way for the general adoption of the custom of primogeniture; so that eldest sons acquired the right of succession, primarily, to the lands held in fee, and consequently to the titles of dignity which were appurtenant to them. The canon of the common law touching descents which pertains to this subject is, that if a man dies seized of real estate of which he had the absolute ownership, without having made any disposition of it by his last will, the whole descends to his heir at law; and this heir at law is that one of his representatives who is the eldest male among those who are in the same degree of kindred. On this rule rests the English custom, and, as Gibbon calls it, the "insolent prerogative" of primogeniture. Large landed estates, however, are perpetuated in families in England far less by this custom of primogeniture (which does not interfere with the owner's legal capacity of testamentary disposal) than by the system of settlements and entails, which rests on principles quite distinct from the former. The English law once allowed land to be entailed interminably, but this power has been gradually reduced, until now the longest settlement can extend only 21 years beyond lives in being when it is made, and the preference of the eldest son, though universal, is in this case altogether voluntary, as in that of a will. Yet the entail very rarely expires with the original limitation, as the first heir on coming of age may join with the existing possessor in resettling the estate and so prolonging the entail. In case of personal property, the right of primogeniture does not exist. In France primogeniture was abolished in 1789, and since that period the tendency of legislation in all countries except the British islands has been to its abolition. In Portugal, where the custom of primogeniture most extensively prevailed, the younger sons of the great families, though too proud to work, were not ashamed to beg, and not rarely lived on alms. In France they crowded into the church and the army, or led a life of complete and often destitute idleness.

PRIMROSE (*primula vulgaris*, Linn.), an early flowering perennial plant, native of Europe, with many single, pale yellow blossoms, which spring from a common stalk concealed in the bosom of the foliage, thus rendering them apparently stemless; its leaves are all radical, erect, oblong-ovate, unequally crenate, smooth above, but veiny, wrinkled, and somewhat rough beneath; flowers with keeled, tubular calyces, divided at top into 5 sharply pointed teeth; the corolla monopetalous, salver-shaped, with 5 entire, spreading segments; stamens 5, with very short filaments and erect anthers; pistil furnished with a long straight style; fruit a capsule filled with numerous brown seeds. The plant delights in a moist, cool, clayey soil, and under cultivation is subject to many variations, there being white, purple, lilac, and even double-flowered permanent varieties known to florists. Even the polyanthus has been known to spring from it, when some peculiarity of soil has affected the plant; and though classed by most botanists as a distinct species under the name of *P. elatior*, it is considered by many as no more than a permanent variety, with brown-colored flowers elevated on a taller peduncle and liable to infinite, richly marked tints, spots, and pencillings of the corolla. (See POLYANTHUS.) A very popular species, much cultivated as a house plant, is the Chinese primrose (*P. Sinensis*, Lindley), with downy, soft, large-toothed leaves on long footstalks, and numerous pale lilac blossoms borne in a spreading umbel upon a common scape. There are varieties with white flowers, others with fringed or fimbriated petals of great beauty, and others with double flowers, all desirable on account of their continuing in bloom the entire year, but of special interest in the winter months. They are readily raised from seeds and from cuttings, preferring a rich, sandy soil.—In the United States the primrose is represented by the bird's-eye (*P. farinosa*, Linn.), found on the shores northern lakes, having elliptical or lanceolate leaves, the lower surfaces entire involucre covered with a white powder; the flowers 3 to 20 in numb ing a yellow eye in the centre of the pa corolla; and by a pretty species 2 to high (*P. Mistassinica*, Mx.), with thin, veiny leaves, flowers 1 to 8 in the corollas broadly and deeply ob flesh-colored, found in the northern of the state of New York and of Verm on the shores of the upper lakes.—The of primrose is also applied to the gen *thera*, comprising rank, coarse-leaved common to Europe and seen in gard the finest species of which are natives western prairies, with large conspicuous soms, either lemon-colored or white. the blossoms opening at sunset, these been termed evening primroses.

PRINCE (Lat. *princeps*), a title apper to a sovereign, to the male offspring of or to persons of eminent rank who are w the attributes of sovereignty. The word *ceps* was employed by the Romans to a senator of rank who held the office of of the city, and was adopted by August his successors in the imperial chair as a dignity. In England the title strictly only to persons of the blood royal, who it by right of birth, and without a formal ment, as in the creation of dukes or ot ders of nobility. The younger sons of ereign retain it until another title is con upon them, but the daughters remain cesses. A special exception is made in case of the eldest son, who is created by prince of Wales. In France, under the *gime*, the title was borne principally by of distinction connected with the blood as the members of the houses of Orleans Bourbon-Condé. Napoleon I. conferred it several of his marshals and ministers. Pre to the present century Germany comprehe a number of petty states called principali and governed by hereditary princes, many whom at present have no territorial sovere ty. In Russia, where it was formerly born the sovereigns, and elsewhere in Europe, title is one of the highest recognized.

PRINCE, THOMAS, an American clergym and historian, born in Sandwich, Mass. 15, 1687, died Oct. 22, 1758. He was educ at Harvard college, and in 1711, after visi Barbados and Madeira, settled as pastor of a church at Combs, in Suffolk, England. he remained until about 1717, when he turned to Massachusetts accompanied by eral of his congregation, and shortly afterw became colleague of the Rev. Joseph Sew at the Old South church in Boston, where remained until his death. In 1727 appea the first volume of his "Annals of New land," materials for which he had coll with great care while in England. It was proved by the legislature, but owing to the indifference of the public was never completed. He also published a number of sermons, and devoted the last year of his life to a revision of the New England version of the Psalms.

PRINCE EDWARD, a S. co. of Va., bordered N. by the Appomattox and S. by the Nottoway river, and drained by several small streams; area, about 350 sq. m.; pop. in 1860, 11,844, of whom 7,341 were slaves. It has a diversified surface and a generally fertile soil, and contains mines of coal and copper. The productions in 1850 were 314,359 bushels of Indian corn, 75,702 of wheat, 87,229 of oats, 2,571,850 lbs. of tobacco, and 10,189 of wool. There were 9 grist mills, 6 tobacco factories, 3 tanneries, 1 iron foundery, 1 newspaper office, 24 churches, and 877 pupils attending public schools. Toward the N. it is intersected by the south side (Petersburg and Lynchburg) railroad, and across the S. E. by the Richmond and Danville railroad. Capital, Prince Edward Court House.

PRINCE EDWARD ISLAND, an island and colony of British America, situated on the S. side of the gulf of St. Lawrence, between lat. 45° 58' and 47° 7' N., and long. 62° and 64° 27' W.; length about 140 m., breadth from 5 to 40 m.; area, 2,134 sq. m.; pop. in 1855, 71,502. It is divided into Prince's, King's, and Queen's counties, the capitals of which are respectively Princetown, Georgetown, and Charlottetown. It is separated from Nova Scotia and New Brunswick by Northumberland strait, which varies in width from 9 to 30 m. The shores are indented by numerous bays, some of which extend so far inland that the island is divided into 3 peninsulas connected by narrow isthmuses, one of which is only about 1 m. broad. The coasts are bold and lined with red cliffs, varying from 20 to 100 feet in height. The surface is well diversified, and watered by numerous springs and rivers. The soil is fertile, and consists for the most part of a thin layer of decayed vegetable matter over a light loam about a foot deep, below which is a stiff clay generally resting upon sandstone. No valuable minerals have been discovered. The climate is very healthy, and much milder than that of the adjoining continent, and is generally free from fogs such as are prevalent on the shores of Cape Breton and Nova Scotia. The island was formerly covered by extensive forests, but they have been nearly all removed, and there is now only sufficient timber for industrial purposes. All kinds of grain, fruit, and vegetables common to temperate regions succeed remarkably well, and bear abundant crops. The breeds of domestic animals have lately been much improved by stock imported from England, and wild animals have become scarce. Seals are found in the bays and on the coasts, and vast numbers of them sometimes arrive on the ice from the Polar sea. Prince Edward Island is one of the best fishing stations on the gulf of St. Lawrence, and the harbors on the N. coast are much frequented. The fishery is principally in the hands of fishermen from the United States, who during the summer months employ from 200 to 300 vessels. The manufactures are of very little importance; and the trade consists of the exchange of agricultural produce, timber, and some fish, for American and British manufactures. During the year 1858-'9 the total value of the exports was $362,741. The population is composed of mixed races, about $\frac{2}{3}$ of the whole being natives of the island. The civil establishment consists of a lieutenant-governor and a chief justice, with the usual assistants. In 1852 the revenue was £20,856 and the expenditure £14,857. Citizens of the United States can hold land in the colony to the extent of 200 acres. The island is in telegraphic communication with the continent of America.

PRINCE GEORGE. I. A S. W. co. of Md., bordered E. by the Patuxent river, and W. by the Potomac and the district of Columbia, and drained by the west branch of the Patuxent, and Piscataway and Anacosta creeks; area, about 600 sq. m.; pop. in 1860, 23,327, of whom 12,479 were slaves. Its surface is somewhat hilly, and contains great quantities of iron ore; the soil is generally very fertile. The productions in 1850 were 1,500,045 bushels of Indian corn, 231,687 of wheat, 67,226 of oats, 47,458 of potatoes, 5,587 tons of hay, 13,409 lbs. of wool, 100,947 of butter, and 8,380,851 of tobacco (the largest amount of tobacco yielded by any county in the Union). There were 4 grist mills, 2 cotton factories, 1 woollen factory, 1 iron furnace, 1 newspaper office, 31 churches, and 240 pupils attending public schools. It is intersected by the Baltimore and Washington railroad. Capital, Upper Marlborough. II. A S. E. co. of Va., bordered N. by James river and N. W. by the Appomattox, and drained by the sources of the Blackwater; area, about 350 sq. m.; pop. in 1860, 8,410, of whom 4,996 were slaves. Its surface is hilly and the soil moderately fertile. The productions in 1850 were 261,510 bushels of Indian corn, 81,042 of wheat, 23,600 of oats, and 16,550 lbs. of tobacco. There were 14 churches, and 198 pupils attending public schools. Value of real estate in 1856, $1,962,626, showing an increase of 45 per cent. since 1850. The N. W. portion is traversed by an extension of the Petersburg and Lynchburg railroad. Capital, Prince George Court House.

PRINCE WILLIAM, a N. E. co. of Va., bordered E. by the Potomac and N. E. by the Occoquan river, and drained by Cedar Run, Broad Run, and Quantico creeks; area, about 325 sq. m.; pop. in 1860, 8,565, of whom 2,356 were slaves. It has a hilly surface and sandy soil. The productions in 1850 were 161,248 bushels of Indian corn, 57,726 of wheat, 57,717 of oats, 2,309 tons of hay, 25,978 lbs. of wool, and 79,079 of butter. There were 19 grist mills, 8 saw mills, a woollen and a cotton factory, 16 churches, and 916 pupils attending public schools. Value of real estate in 1856, $2,585,-698, showing an increase of 52 per cent. since 1850. It is intersected by the Orange and Alexandria railroad, a branch of which, the Manassas Gap railroad, traverses the northern portion. Capital, Brentsville.

PRINCESS ANNE, a co. forming the S. E. extremity of Va., bordered N. by Chesapeake bay, E. by the Atlantic, and S. by North Carolina; area, about 400 sq. m.; pop. in 1860, 7,714, of whom 3,186 were slaves. It has a level surface and sandy soil, and contains large forests of pine and cypress, affording an important lumber trade. The productions in 1850 were 347,141 bushels of Indian corn, 60,024 of oats, 2,529 of wheat, 1,593 tons of hay, and 12,115 lbs. of wool. There were 4 grist mills, 3 saw mills, 17 churches, and 819 pupils attending public schools. Value of real estate in 1856, $1,499,146, showing an increase of 22 per cent. since 1850. Capital, Princess Anne Court House.

PRINCETON, a township and village of Mercer co., N. J., within a mile of the New Jersey railroad and the Delaware and Raritan canal, 40 m. N. E. from Philadelphia, and 11 m. N. E. from Trenton; pop. of the township in 1860, 3,772; of the village, 3,160. The village is neatly built and pleasantly situated, and contains a theological seminary of the Presbyterian church, founded in 1812, a bank, a newspaper office, and several churches. It is the seat of the college of New Jersey, founded at Elizabethtown in 1746 by the Presbyterian synod of New York, then separated from the synod of Philadelphia, under a charter obtained from the colonial government. Jonathan Dickinson was its first president, but died in the following year. In 1748 a new charter was obtained through Governor Belcher, and the Rev. Aaron Burr was chosen president. The college was removed to Princeton in 1757, in which year President Burr died, and in 1757 Jonathan Edwards, his father-in-law, assumed the office, but lived scarcely long enough thereafter to even enter upon his duties. The next incumbent, the Rev. Samuel Davies, accepted the presidency in 1759 after a second appointment, having declined the first, but died in 1761, less than two years after his installation. The Rev. John Maclean, the present incumbent, inaugurated in 1854, is the 10th president of the college. Nassau hall, erected in 1756 for the use of the college, was at that time considered the largest and one of the finest buildings in the colonies. In 1777 it was occupied by British troops, in 1802 nearly destroyed by fire, and on March 9, 1855, entirely consumed. In 1860 the college had 19 instructors, 314 students, 3,796 alumni, and a library of 24,000 volumes.

PRINCETON, Battle of. After the defeat and capture of the Hessians at Trenton, Dec. 26, 1776, Cornwallis, who was about embarking for England, resumed his command of the British in the Jerseys, and, having concentrated his forces at Princeton, advanced (Jan. 2,
with nearly the whole force to Trent
occupied by Washington and the Amer
army. It was nightfall before the British
established themselves on the W. bank
Assunpink, a small stream fordable in
places, and crossed by a bridge command
the revolutionary troops, and Cornwall
cided to postpone the decisive attack until
day. Washington, finding himself oppo
an army superior in discipline and numb
his own brave but inexperienced troop
cut off from retreat by the Delaware,
with ice, and impassable within the time
able for escape, projected a diversion to
Princeton, where, by attacking and def
the remaining troops, he could seize upo
supplies and munitions stored there and
proceed to Brunswick. Gen. Leslie wit
rear guard of the British army was at Ma
head, about half way between the two p
and 3 regiments of infantry and 3 tr
of dragoons were still at Princeton. A
of Leslie's position, Washington determi
make a detour by the Quaker road, whi
scribed a circuit until within 2 m. of Prin
where it joined the main road; but it was
in good condition, and the march was imp
so that it was sunrise before he reach
bridge at Stony Brook, about 3 m. from Pr
ton. Here he took a shorter and more conce
road, and ordered Gen. Mercer to proce
the brook and take possession of a brid
the main road. Thus far the enemy were
ware of his movements. At the Assunp
detachment was left to dig trenches in
that the noise might be heard in the B
camp, to keep and relieve guard, and to
the camp fires. They were ordered to h
after the main army at daybreak. The bag
had been quietly removed to Burlington.
British remaining at Princeton had comme
their movement toward Trenton, and
Mawhood having passed the bridge on the
road over Stony Brook, while marching thro
a wood discovered Mercer's advance, and
posing them a portion of the defeated Amer
army, put back to intercept their flight. A
emerged from the wood and recrossed the br
he came upon Mercer's brigade. At once
made for a piece of rising ground to obtain
advantage of its position. It was gained
the Americans, who opened a sharp fire on
enemy, which they vigorously returned.
their first fire the horse of Mercer was ki
and a colonel mortally wounded. The Brit
availing themselves of the resulting confu
charged with the bayonet, a weapon of wh
the Americans were destitute, and after a s
struggle, during which Gen. Mercer rece
several desperate wounds which in a few d
proved fatal, they gained the position and dr
the Americans before them. After a sh
pursuit the British were brought to a st
by a detachment of Pennsylvania troops de
patched by Washington, on hearing the fir

he assistance of Mercer. Mawhood halted, opening his artillery on the reinforcement pped their advance. At this critical mo- nt Washington appeared on the field. De- ling at once the desperate state of affairs, he loped forward among his broken troops, o, inspired by his gallantry, rallied and re- ned the battle, while a regiment of Virgin- s came up, and an American battery which just arrived opened its fire upon the enemy. e action was fiercely contested; Col. Maw- od fought with the most desperate bravery, d eventually forcing his way by the bayonet the main road, retreated toward Trenton. ring this struggle Washington distinguished nself by his personal daring, rushing into the ckest of the fight, and animating his men the example of his own courage. The 55th tish regiment had in the mean time been ountered by the advance guard under Gen. Clair, had given way, and was in full re- t toward Brunswick. The remaining regi- nt, not having been able to get up in time participate in the engagement, divided, a tion retreating toward Brunswick, and the taking refuge in Nassau hall, belonging to college of New Jersey, but for some time upied by the British as barracks. These rendered after receiving a few shots from an erican battery. In this action, so gallantly ducted by the wearied, poorly fed, and rly clad Americans, their loss was not more n 30 men, beside Gen. Mercer, Cols. Haslet d Potter, Major Morris, and 3 captains. The tish left about 100 dead on the field, and rly 300, including 14 officers, yielded them- es prisoners. Washington now moved on Morristown, destroying the bridges on his rch, and confined himself for some time erward to a system of persistent annoyance, ich had the result of driving the enemy out nearly the whole of New Jersey.

PRINCIPATO CITRA, a central province Naples, bounded N. W. and N. by the prov- es of Terra di Lavoro and Principato Ultra, and S. E. by Basilicata, and S. and W. by e Mediterranean; area, 2,271 sq. m.; pop. in 56, 589,979. Capital, Salerno. The surface much broken by offsets from the Apennines, d there are considerable tracts of level ground ng the shore of the bay of Salerno. The st line is irregular, and nearly half of it con- ts of a bold curve which forms the bay of erno. A great part of the province is watered the Sele and its affluents. The principal nerals are copper, marble, and gypsum. The chovy and tunny fishery is very productive.

PRINCIPATO ULTRA, a province of Naples, unded N. by the province of Molise, N. E. d E. by Capitanata, S. E. by Basilicata, S. by incipato Citra, and W. by Terra di Lavoro; ea, 1,409 sq. m.; pop. in 1856, 375,919. Capi- l, Avellino. The former papal territory of Ben- vento is entirely surrounded by this province. he chief rivers are the Calore and Carapella. he province is almost entirely covered with the Apennines. The soil, especially in the valleys, is fertile and well cultivated.

PRINGLE, Thomas, a Scottish poet and journalist, born at Blaiklaw, Teviotdale, in 1789, died in 1834. After passing through the university of Edinburgh, he obtained the position of clerk to the commissioners on the public records of Scotland, which he held until 1817, when he commenced the "Edinburgh Monthly Magazine," which was the germ of "Blackwood's Magazine." At the same time he was editor of the "Edinburgh Star" newspaper, and joint editor of "Constable's Magazine." He soon quarrelled with Blackwood, and, his other publications being unprofitable, went out to the Cape of Good Hope in 1820, and became government librarian at Capetown. Here he also established a private academy, founded the "South African Journal," and edited at the same time the "South African Commercial Advertiser," both of which periodicals were discontinued in consequence of the censorship exercised over them by the colonial governor. Pringle returned to Great Britain in 1826, and became secretary to the anti-slavery society, which situation he held until the abolition of slavery in the colonies, when the society was dissolved. During this period he published his "Narrative of a Residence in South Africa," upon which and upon his poems his reputation chiefly rests. A collection of his poetical works has been published, with a sketch of his life by Leitch Ritchie.

PRINTING (Lat. *imprimo*, to stamp or imprint, from *in*, upon, and *premo*, to press), the taking impressions from types or engraved plates, for the purpose of multiplying at a cheap rate reversed copies of the designs they present; including also in a general sense the preliminary processes of composing and preparing types for impression or for casting plates. In its simplest forms the art has been practised by different nations from remote antiquity. The bricks from the ruins of Egypt and of Assyria are impressed with characters stamped in the clay. Seals and signets were used by the Israelites, and in later periods the Romans used stamps for producing inscriptions, as the name of the maker or vender, upon various articles of merchandise, and brands for marking cattle with the letters of the owner's name. Some of the Roman inscriptions still in existence appear like rude printing. It has been supposed that a passage in Cicero *De Natura Deorum* giving directions respecting types made of metal, and called by him *formæ literarum* (the very name afterward applied to types by their inventors), may have suggested the idea of them. And it is not a little remarkable, considering the immense importance of the art of printing, and the labor and expense incurred by the ancients in copying books by pen, that they should have approached so near the invention of movable types without these being finally brought into use until the 15th century. Among eastern nations, as the Chi-

nese, Japanese, and Tartars, the printing of books from engraved blocks had indeed been practised from the most remote periods; a process which is not yet abandoned by the races named for movable type printing. Their method is to paste the page, prepared by the pen on tracing paper, face down upon a block of hard wood. The engraver then cuts away the portions of the wood and paper not covered with the characters, leaving these in relief. The printer, with two fine soft brushes in the right hand, blackens the whole surface of the block with the ink in one, and laying on the paper smooths it gently down with the other, which is dry, and thus obtains an impression from the raised parts alone. Each impression consists of two pages, divided by a line down the middle; on this line they are folded back to back and fastened together, so as to include the single edges in the binding and leave the folded edge in front. As noticed in the article ENGRAVING, this block printing was practised in Germany for producing playing cards and illustrations for manuscript works early in the 15th century, before movable types were invented. In their use it is not unreasonable to suppose that the idea was suggested of dividing them into parts and employing these in such combinations as might be convenient; and that the division might thus be extended to single types. The time and place of the invention of these are not known with certainty. The city of Haarlem in Holland claims that Laurens Janszoon Coster there invented the art of printing in 1423, making use of movable types of wood and afterward of lead and tin; but no printed works of his can be identified. The claims of Johannes Gutenberg to this invention are more generally recognized. He without question was occupied in various experimental researches of a secret nature in Strasbourg, and possessed in 1438 printing materials, a press, and as it appears movable types. No book, however, was brought out by their use until after Gutenberg had returned (which was about 1450) to his native city of Mentz. Here he associated himself with a wealthy citizen, Johann Faust, who, on learning the secrets of the art, entered into partnership with Gutenberg, and agreed to furnish funds for developing the process. They employed to assist them Peter Schöffer, a scribe whose previous occupation had been the copying of books, and who appears to have been a man of taste and genius, and well fitted to bring a new process of this sort favorably before the public. He has the credit of substituting metallic types cast in plaster moulds in the place of those which Gutenberg had previously made by carving pieces of wood and metal, and of still further perfecting the art by the invention of punches in hard metal, by the use of which sharpness of outline could be given to the matrices in which the types were cast, and perfect uniformity be retained in the type by continuing to use the same punches for pro
as many matrices as might be required.
inventors succeeded in printing a consid
number of books, the first of which kn
have been printed with movable types
editions of Donatus. The first work
date (1455) was the *Litteræ Indulgentiæ*
V. Pont. Max., which was complete in a
page. In the year 1462, by reason of th
ture of the city of Mentz by Count A
of Nassau, the printing operations carr
there were checked, and the printers w
persed into other states. The fame of the
had preceded them, and new enterpris
rapidly undertaken in other cities. P
presses were in operation at Subiaco ne
in 1465, and the types employed were m
those now called Roman than like the
forms of the Germans, which with the
ters imitating handwriting had up to this
alone been used. In 1469 printing wa
duced into Milan and Venice; and the p
tions of the presses of John de Spira and C
topher Valdarfar of the latter city a
great fame for their perfection and beau
devices with which these early publ
were adorned were often artistic pro
of themselves giving an interest and v
the works. As copies of the early e
became scarce, they were more and more p
and in some instances have been sold fo
ordinary sums. The highest price ever
for any printed work was for the only p
copy known to exist of Valdarfar's 1st e
of Boccaccio's *Decamerone* of 1471. It
sold at auction in London, June, 1811, and
off by the marquis of Blandford for £
Lord Spencer competing for the prize
£2,250. Printing was introduced into
in 1470, and into London in 1474. (See
TON, WILLIAM.) Before the year 150
stated, printing presses had been set up
places in Europe, and a multitude of e
of the classical writers in their appro
Greek and Latin characters were given
world. A Greek grammar wholly in G
types was printed in Milan in 1476, and
first work wholly in Roman type was Ci
Epistolæ Familiares, printed at Rome in 1
A Hebrew Bible was printed at Soncino i
duchy of Milan in 1488. Italic type wa
vented about the year 1500 by Aldus Ma
of Venice. In the United States the first p
ing press was introduced at Cambridge, M
in 1639. (See CAMBRIDGE, vol. iv. p. 29
the apparatus employed by the earliest pri
the devices on the title pages of the wor
Badius Ascensius of Lyons (1495–153
to convey some idea. The presses were si
contrivances capable of printing only 4 p
at a time, and that at two pulls; but su
they were, they continued in use with l
improvement into the 17th century. The
at first employed was apparently brown un
well ground and thin. The earliest cop
the *Speculum* and *Biblia Pauperum* were pr

with it; and the effect is said to have been
ter than that of black ink in its harmo-
with the colors of the adornments. The
k and red inks were of excellent character,
surpassed by those now in use. The black
s of a deep rich color, and so continues in
old books till the present time, and the
er near it is not in the slightest degree tar-
hed by it. It was applied to the types by
ls of skin stuffed with wool, a method not
tirely out of use in the 19th century. The
s were ground upon a stone slab with a
uller, and from this slab were taken up by
balls, which were dabbed down upon them
the purpose. Cases for the type were simi-
to those now used. The typography in
st respects was rudely executed, and some-
at obscure from the words running into one
other, from defective punctuation, and nu-
rous abbreviations. Blank spaces were left
initial letters, which were afterward filled
by those whose employment had been to
uminate the old manuscripts, a style of work
ich could not be imitated by types. Nu-
rous other ornaments in brilliant colors were
oduced by the illuminators, and the margins
the pages were often covered with figures
saints, birds, flowers, monsters, &c., which
d not necessarily any relation to the subjects
ated in the text. The types were of uniform
aracter throughout, usually Gothic letters.
e date and name of the printer were com-
only omitted, but sometimes appeared at the
d of the book. Editions were small, 200 or
0 being considered a large impression. The
anufacture of type, properly a distinct branch
om printing, was not so regarded at first,
d the printers commonly prepared their own
pe. Still the types used in different countries
metimes betray a common origin; for ex-
ple, those used by Caxton at one time in
gland were evidently of the same character
ith the types of John Brito of Bruges and of
hn Valdeuer of Utrecht. Many were fur-
shed to printers by Ulrich Zell, the father of
e Cologne press, and by Wynkin de Worde,
axton's successor. Type founding was ex-
ressly declared to be a distinct art from that
f the printer by a decree of the star chamber in
637, and 4 founders were appointed to supply
ll the printers in Great Britain with type. At
his time the mechanical execution of printed
orks had greatly deteriorated. The artistic
esigns and ornaments of the old illuminators
ad gone out of use, and the typography which
ucceeded was of very inferior character. Such
ontinued to be the case during the 17th cen-
ury. One of the first who devoted himself to
ts improvement was John Baskerville, a japan-
er of Birmingham. About the year 1750 he
ngaged in cutting punches for type, and pro-
duced those of such excellent proportions, that
ubsequent improvements have done little more
than to increase the delicacy of the lines, and
add to the variety of the forms. After his death
in 1775 his types and punches were purchased
for the splendid edition of Voltaire's works published by Beaumarchais. The art continued to be sustained in the same perfection by Bulmer, whose Shakespeare and Milton are among the most splendid specimens of typography ever executed.—During the present century a great variety of ornamental type has been introduced, the styles differing from each other in the shapes of the letters, in the heaviness or lightness of the lines, and in the shading. Great ingenuity has been exercised in multiplying these varieties in so limited a field. The largest size of type for books is called great primer, and is seen in the largest old Bibles; it is now seldom used. English, which is the next lower size, is seen in church Bibles, in folios, and some quartos. Pica, small pica, long primer, and bourgeois are the sizes most in use. The last named is the type employed in this cyclopædia. The succeeding varieties are brevier, minion, nonpareil, agate or ruby, pearl, diamond, and brilliant, the last being very rare, and the smallest type used in books. In the following list the different sizes are exhibited, each with its own name:

Great Primer, English, Pica,
Small Pica, Long Primer, Bourgeois,
Brevier, Minion, Nonpareil, Agate, Pearl, Diamond, Brilliant.

For handbills or posters special types are employed of extra large sizes. A complete assortment of one size is called a font or fount, and the "sorts" that make up an ordinary font of Roman type are as follows: 3 complete alphabets in capitals, small capitals, and small or "lower case" letters, making 78 characters; the double letters ff, fi, fl, ffi, ffl (each cast in a single piece on account of the kern or bend of the *f* not permitting it to stand separately against another f, an i, or an l), 5; the diphthongs Æ, Œ, æ, œ, *æ*, *œ*, 6; figures, 10; marks of punctuation, 6; the apostrophe, hyphen, parenthesis, and bracket, 4; 4 sizes of dashes, and braces in 5 pieces, 9; the characters &, *&*, §, £, ☞, 5; and the references *, †, ‡, §, ‖, ¶, 6; total characters, 129. Besides these, there are required for filling the blanks between words, at the ends of lines, &c., 4 sizes of spaces and 4 of quadrats (the former and the smallest of the latter being subdivisions of the em [m] or square of the size of the type, one equal to it, and the other two multiples of it), making altogether 137 sorts. To every complete font there should also be a suite of accented and long and short vowels, with the sedilla c (ç), Spanish n (ñ), &c., which are only furnished by the founders when separately ordered, making 40 to 100 additional sorts. There are many other characters only required for special occasions, as astronomical and mathematical signs. An ordinary font of Italics comprises 60 characters, viz.: 2 alphabets in capitals and small letters, capital and small diphthongs, colon, semicolon, interrogation and exclamation points; to which are to be added accents, &c. Italic small capitals are also sometimes made. The proportions of the principal pieces in a Roman font of 800 lbs. of pica (comprising altogether about 150,000 pieces) are as follows: Capitals, from 300 to 600 of each, excepting Q and X, 180 each, and Z, 80. Small capitals range one half as many of each letter as the capitals.

a	8,500	f	2,517	p	1,750	y	2,000
e	12,000	g	1,700	q	500	z	200
i	8,000	h	6,400	r	6,200	,	4,500
o	8,000	j	400	s	8,000	;	800
u	8,400	k	800	t	9,000	:	600
b	1,600	l	4,000	v	1,200	.	2,000
c	8,000	m	8,000	w	2,000		
d	4,400	n	8,000	x	400		
Thick spaces			18,000	Thin spaces			8,000
Middle spaces			12,000	Hair spaces			8,000

To place all these pieces within convenient reach of the type setter or compositor, they are distributed in the "boxes" or cells of two open cases, which are arranged sloping forward, one behind and above the other, and forming with it an obtuse angle, on a frame the top of which they cover at a convenient height for the workman, who stands in front. In the upper case, with boxes all of one size, and like the lower case in two equal divisions, are the capitals, the large ones on the left and the small ones on the right (an arrangement which is sometimes advantageously reversed), with references, braces, dashes, &c., in the top rows. The lower case contains boxes of a variety of sizes severally adapted to the quantities of type required of each letter, the central boxes most convenient to the printer's hand being the largest and containing the letters most used. The spaces, quadrats, points, and figures also have boxes in this case. The Italics are in other cases, sometimes set as drawers in the lower part of the frame. An improved form of case has been patented by Mr. Thomas N. Rooker, of New York, designed to lessen the movements of the hand of the compositor by bringing the boxes into a more limited space. A single case is employed instead of two, and the small boxes for the capitals are placed immediately adjoining those of the corresponding small letters. Another form patented by him occupies little more than half the space of the ordinary case, saving the compositor long reaches for the various sorts, and greatly increasing the amount of work he can do. The boxes are made with movable bottoms, readily raised and lowered by a screw; thus, though small, they can be made to hold type enough for a week's work, and are in effect always full until exhausted. The case for music type is similar in form to the ordinary case. The difference consists simply in the subdivision of the larger boxes, required by the greater number of music signs. The various fonts of music type, named from the size of the letter, are minion, minionette, nonpareil, agate, pearl, diamond, and excelsior. These differ slightly in the number of characters in a font, but usually contain over 200 separate signs. The lower case is occupied with the white and black notes, the lines (varying in size from an en to 4 ems), the angles ings, rests, bars, &c.; and the upper tains the characters less frequently portion of the upper case is also occu miniature notes, groupings, &c., corre to the large characters.—In setting compositor, having the copy or ma laid before him, on the upper case, an ing in his left hand the composing little iron tray capable of holding 10 lines according to the size of the ty adjusted by a slide to the exact le the line), sets the first type in the l corner of the stick against a flat thin brass or steel, called the composing or rule. He looks only to see that the typ from the right box, and seizes it i a way as to bring the nick or notch, w made on the side of every type corres to the bottom of the letter, from hi places it in the stick, the reverse of rangement of the letter when printed. succeeding letters rapidly follow, and end of each word he sets a space. On ing the end of the line he rearran spaces, so as to make it exactly full. cure a uniform separation of the wor process is called justification, and to curately and rapidly without repeated an important qualification of a good c tor. The line being finished, the co rule is taken out and slipped in front, a new line is commenced. The lines ar brought close together, and the prin designated solid. If it is desired to hav open, a slip of type metal, just the len the line and the height of the spaces a lead, is introduced between each, and fo open printing thicker leads or two or m them are used. The printing is then des leaded or thick-leaded. When the com stick is nearly filled, the rule is bro front of the last line, and the whole is off upon a larger tray called a galley. In this some skill is required to prevent the falling apart, or, as it is called, being t into pi. On the galleys the types are ma into pages. At the bottom of the first pa set a type indicating by the figure 1 or le the first sheet or "signature," and upon th page for a quarto, or 17th for an octavo, mencing another sheet, is set the figure letter B, and so on; thus designating, for venience in gathering, folding, and bi the order of the sheets; this figure or let ways appearing on the outside of the when it is folded in pages. The pages as are removed from the galleys, secured twine bound around the types, are imp *i. e.*, set in the order for printing, upon a ble or iron slab called the imposing sto pages together for a folio, 8 for a quar for an octavo, 24 for a duodecimo, &c. (be the introduction of the steam press, *half* the numbers, as indicated by the designatio The impressions of these pages are to be take

ater upon one side of the sheet of paper.
ong iron frame called a *chase* (Fr. *châsse*,
, or *châsse*, a frame), with cross bars di-
g it into quarters, is then placed down so
enclose the pages, which are secured in
proper positions by what is termed furni-
consisting of strips of wood or metal
r than the types. One tapering strip is
d along the outer side and one along the
m of each quarter, called side and foot
, and by small blocks called quoins (Fr.
a wedge) driven with a mallet and "shoot-
tick" (a tapering piece of very hard wood
ow) between these and the chase the pages
firmly held in their place. This is called
ing, and the whole is a "form." For news-
rs and other publications on large single
s the forms are used in pairs, one for each
of the sheet, that having the first page
g called the outer, and the other the inner;
in nearly all book work each form is now
e complete in itself, called a half sheet impo-
n, and the sheets of paper, when the whole
ion has been printed on one side, are turned
for end and printed on the other from the
e type, and afterward cut in two. The ar-
gement of the pages for a quarto may be
by spreading out one of the double news-
ers of the day of 8 pages. One side, it will
bserved, comprises the 1st, 8th, 4th, and
pages, belonging to the outer form, and the
er side the remaining pages. As the num-
of pages to a form increases in octavos,
decimos, &c. (sometimes, for miniature vol-
s, as many as 128), the arrangement be-
es more complicated. A first proof is
n from the types commonly before they
made into pages; for which purpose they
temporarily secured on the galley, and being
ed, a sheet of paper is laid on and pressed
n by a hand roller. This proof is examined
the proof reader, and the errors being
ked after the plan indicated in the article
ECTION OF THE PRESS, the compositor picks
the types that are to be removed and in-
s others as required. After being made up
o pages other proofs are taken to be read
the author or other readers, and the correc-
ns are introduced by unlocking, *i. e.*, loos-
g the quoins, so that some types may be
en out and others set in. It is obvious that
work of the compositor may be greatly in-
ased by inattention on the part of the cor-
ctor to substituting the same quantity of mat-
r for that removed. To take out or add a
rtion of a line may involve the respacing of
ny lines, and a more considerable change in
e quantity may require a new adjustment of
l the succeeding pages that are made up. The
s on which compositors in American print-
offices are paid for their work is the esti-
ed number of "ems" or squares (compris-
about 2 letters each) he has set, the price
ing so much per thousand. In this estimate,
book work, so many lines are allowed for a
e as the types would make in solid printing,
including the heading over the top and the line of quadrats at the bottom, and these are multiplied by the number of ems in a line; thus, the number of pages being given, the whole amount is readily determined. Blank spaces in the page are paid for as full. Tables and extra work occasioned by words in foreign languages and other unusual styles of printing involve extra pay. In newspaper and job work the amount of composition is found by multiplying the whole number of lines set, measured by a gauge on the type or a proof, by the number of ems in a line. In English printing offices the reckoning is by letters or ens (n), making the thousand one half that of American printers. The time of the compositor is divided between the composing or setting, which takes about two thirds of it, and making up and imposing (which however in American offices are now usually made a separate branch of work), correcting, and distributing. The types after the copies required have been struck off are washed in the forms with lye and rinsed with water till the latter runs off clear. They are then as required returned to their boxes, for which purpose the compositor wets them with a sponge so that they shall adhere together, then places a quantity in his left hand supported by his composing rule, with the nicks upward and the face toward him, takes a few letters between the fingers and thumb of his right hand, and, seeing by a glance what they are, drops them with great rapidity into their proper boxes. If this is not done with accuracy, he suffers loss by the time spent in correcting the errors that will consequently appear in the next matter set up. In a day's work of 10 hours a good compositor will set, correct, and distribute 6,000 ems or 12,000 letters. —*Type Setting and Distributing Machines.* A variety of machines have been contrived for setting type and others for distributing; and a few among them have been put in successful practice. Those best known are the invention of Mr. William H. Mitchel, of New York. Of his type setting or composing machines 10 have for some time been kept in operation in the printing house employed upon this cyclopædia, and also a number of the distributing machines. The former were the first invented, and the latter were especially designed to meet their requirement in supplying the types regularly ranged in ranks, each letter by itself. The type setter is a machine in shape like a harpsichord piano. It is furnished with 54 keys, each one of which is marked with a small letter, point, or space. One capital, I, has also its key. The other capitals and special types are arranged in the cells of a small case back of the keys; and as one of them is wanted it is taken by the operator and dropped into the mouth of a slide by which it is carried on till it takes its place among the others. The types which connect with the keys are piled up on their sides in regular lines on brass slides of which one edge is turned up, and these slides are

ranged across the machine standing nearly vertically. As a key is struck with the finger the type at the bottom of the pile is pushed out edgewise, and falls lengthwise upon a narrow endless tape, which instantly carries it onward back from the operator. There are 84 of these tapes parallel to each other constantly revolving at the same rate; those on the right hand side of the operator are very short, but toward the left there is a constant increase in their length up to 2 feet of carrying surface. As each of them passes round the little brass roller and under the table, the type it carries is tipped off upon a receiving tape, the revolution of which is obliquely across the line of all the others and toward the left. The movement is so arranged, and the distances travelled by the different types are so proportioned, that these must lie along the receiving tape in just the order the keys were struck. The receiving tape at the end of its circuit discharges them one by one upon the periphery of a narrow wheel, which as it revolves leaves them in a standing position and correctly set upon a long brass slide. With each type added the row is pushed along by the wheel the thickness of the type; and when the slide is full, it is placed upon a receiving stand containing 10 cells, and drawn from beneath the type. The slide is then replaced upon the machine. From the receiving stands the types are removed as may be convenient, and made up into lines and pages. By the use of these machines a considerable economy is experienced in the expense of setting.—The distributing machines are used in connection with the composing machines. The types employed are specially prepared by means of nicks differently placed on each letter, but always on the upper or opposite side to that nicked in all types for designating the foot of the letter. The types to be distributed are ranged in a single line in a long channel upon the top of the machine, and by a weight suspended over a pulley they are pushed along this channel as required. At the end one at a time is pushed to one side, and drops into an open slot on the outer surface of a revolving cylinder. In this slot it hangs suspended just so low as the nicks admit, and the lower end projects below the edge of the cylinder a corresponding distance, which is different for each letter. As the cylinder moves round the types are carried on, and each in its turn, when opposite the compartment to which it belongs, is hit upon its lower end by a little projection upon the fixed part of the machine, which throws it out of its place, and causes it to fall down and be received in a standing position upon one of the slides diverging horizontally like radii from the revolving cylinder in the centre. The rows of type as fast as they accumulate, one row in each slide, are pushed along by little levers kept in constant action under the cylinder; and whenever a slide is full it is ready to be transferred to the composing machine. Each of these machines is kept in operation by a belt from a
pulley of the shafting, and they are tende
boys or girls who have had no experien
compositors.—*Stereotype Printing.* The
being distributed after the required num
impressions have been taken, if at any time
copies are called for, the whole must be
set up, proofs corrected, &c. In the case of
ter difficult of correction, and in which
errors might seriously affect the value
work, as in mathematical tables, and
books like Bibles and psalm books for
the demand was constant, it was long ag
expedient to retain the forms for repeate
But this involved a large outlay for typ
the forms were not secure from acciden
might involve resetting portions of the
Early in the 18th century Van der Mey, in
den, invented a method of forming the
into solid plates by soldering their lowe
together, and with these he printed
thousand Dutch Bibles. This method
ever, did not release the types for other
The merit of inventing the improved pro
stereotyping, by which the types are lib
is claimed by the English for William
Edinburgh, who is said to have suggest
1725, and afterward introduced it to
tent. He failed, however, in establi
use against the opposition of the typ
and its true nature was not made
Firmin Didot adopted or reinvented the
of Van der Mey, and by means of it
preserved free from error the valuable
mic and other tables of Callet. But,
fied with the method, he invented ano
which he gave the name of stereotypin
στερεος, solid, and *τυπος*, type), which ha
been applied to various other method
fecting the same object. He made short
of harder composition than usual by
copper to the alloy, and the page comp
these was so arranged in a machine
could be suddenly struck upon a
smooth sheet of soft lead, and impart
correct impression. Several matrices
might thus be obtained, and from each
a reverse impression could be restored
metal. This was done by striking th
sheet upon the surface of type metal as
of this in a mould was in the act of be
solid in cooling after fusion. These
print from, and could be retained for
time, while the original types were
other uses. This plan was not altoge
isfactory, special types being required,
impressions often being defective, and
to small forms. A better method was
ed through the exertions of Earl Stanh
has been very generally employed. A
cast is obtained, with very particular
the page set up with ordinary type, exc
the quadrats and spaces are of the same
with the body of the letter types. The
being removed is exposed for two hours
oven heated to full 400° F. It is then
face down in an iron box or casting pot.

r of which is firmly secured, and the whole
ually immersed in the melted alloy, the
having been previously brought to the
erature of the fluid metal. The alloy
ing in works under the plaster mould,
g it and a floating plate upon which it
s against the cover. When taken out the
s set with the bottom in water to cool be-
the upper surface of the alloy, while more
he liquid alloy is poured into the top to
up sufficient pressure against the plaster.
cooling completed, the plaster mould is
n out and broken up, and the plate is prop-
dressed by planing the back and edges.
hickness is only about $\frac{1}{8}$ of an inch, and it
therefore in printing to be backed with a
den block to make its surface level with a
e of ordinary type. But it is of convenient
pe for storing away, or for transporting to
ant places to be there used for multiplying
es. It is in this form that, without recom-
ing and without risk of alterations, the
e work may be reproduced almost simul-
ously in New York, London, Paris, &c.
d cuts may be cheaply multiplied by this
ell as by the electrotype process of stereo-
ing, an account of which, as applied to the
eotyping of this work, is given in ELECTRO-
ALLURGY, vol. vii. p. 76. An improvement
duced in this since that account was pre-
d is worthy of mention. A first coating of
per is precipitated upon the powdered plum-
o with which the surface of the types is
ered, by the application of a wash of sulphate
copper, and the immediate sprinkling over
s of fine iron filings or iron dust. A film
copper is thus at once produced, and the
e being then placed in the battery the de-
it of the required thickness is much more
kly obtained.—Though the electrotype pro-
s is the most beautiful and perfect method
stereotyping, it is not found so convenient
practice for the rapid production of large
s, such as newspapers; and the use of
ter of Paris has proved too troublesome for
new application of the art. Stereotyping
large daily papers, though the plates are
d but one day, and are then consigned to the
ing pot, is found to be of great economy by
ing the types from wear in the press, and
urning them to the cases as soon as a single
t is obtained from the forms. A very in-
ous and neat method of quickly obtain-
this cast (devised in France), called the
er process, has been of late applied to
ting the London "Times," and has also
n introduced into New York, where it was
employed in 1861 for the "Tribune" news-
er. The forms are prepared in ordinary
each containing one page of the paper.
ile they are being made up the stereotyper
ares the material for the matrices. For
purpose a sheet of paper of the proper size
d upon a table, and with a brush covered
h an adhesive composition, on which tissue
er is laid; to this are added successively other sheets and coatings of the composition, until a moulding sheet $\frac{1}{12}$ of an inch thick is obtained. The form of type, brushed clean on both sides, being laid upon an iron table and slightly oiled on the face, the moulding sheet is applied to it and beaten with a stiff compact brush until it is well set around the shoulders of the type and assumes an embossed appearance. Woollen cloths are then laid over the matrix and form, and the whole placed on a steam table under a platen, which is tightly screwed down in order to impart to the matrix a perfect impress from the face of the type, and at the same time to expel the moisture from the matrix into the blankets by the heat of steam let into the hollow table. This process occupies but a few minutes, when the matrix, now as pliable as Bristol board, is removed and placed in the mould. This is of iron, made concave with a curve conforming to that of the cylinder upon which the plate is to be printed, with a corresponding convex cover, and under this an iron frame going round the margin of the matrix to secure it in proper shape in its place. When it is made ready the mould is set on one end and the liquid metal poured from a ladle through an orifice in the other end. As soon as possible the plate is taken out, cooled and hardened in a tank of water, and its sprue end cut off by a circular saw driven by steam. It is then placed in a planing machine, face down, protected by a sheet of pasteboard, and the ribs which are cast on the back planed smooth and even. With these ribs the plate is exactly equal in thickness to the height of type, and weighs about 65 lbs. The "New York Herald" uses a much thinner plate, without ribs. It is now taken to a table, where it is finished by trimming the edges with a hand plane, and cutting out with a chisel any portions of metal in the open spaces which are so high as to be likely to black the paper in printing. The average time consumed in stereotyping the forms of the "Tribune" is from 30 to 35 minutes; and its forms have been ready for the press in 20 minutes from the time the last page was given to the stereotyper. A set of the plates secured to the printing cylinders answers perfectly well for an edition of more than 200,000 copies. The same method of stereotyping is also in use to some extent in New York for small articles of press work.—Some of the subjects connected with printing have already been treated under other heads. Thus the composition of printers' ink is given under INK; printing from engraved plates is noticed in the articles ENGRAVING and LITHOGRAPHY; and the processes of calico printing and anastatic printing under their own heads. The nature of the printing employed for the blind is noticed under BLIND.—*Nature Printing.* The art of reproducing upon paper, by the process so called, the exact figures of portions of plants and other objects, has within a few years been brought to great

perfection in Europe, especially in the imperial printing establishment at Vienna. That true pictorial representations of flowers, leaves, &c., might be obtained by impressions upon paper for botanical studies, was suggested in the "Book of Art" of Alexis Pedemontanus as far back as 1572; and in the next century copies representing the structure of leaves, &c., were made by pressing dried plants coated with lamp smoke between two pieces of paper. The botanist Hessel, as stated by Linnæus in his *Philosophia Botanica*, obtained in America figures of plants by impression in 1707; and at a later period (1728–'57) a printing establishment at Erfurt was employed in bringing out the great work of Prof. Kniphof, *Herbarium Vivum*, in 12 folio volumes, with 1,200 illustrations produced by this process, printer's ink being substituted for lampblack. The impressions were then first colored, also in imitation of nature. Other works of similar character were occasionally produced after this in Germany and France. In 1833 Peter Kyhl, a goldsmith and engraver at Copenhagen, made known a curious method he had employed of ornamenting silver plate with copies of natural objects, obtaining the forms by impressing these objects upon the metal by means of two steel rollers; and at the exhibition of industry held at Charlottenburg in May, 1833, he produced a number of beautiful specimens of this work. He prepared an account of the process, and illustrated it with printed copies of leaves, feathers, lace, and other fabrics, the scales of fishes, and serpent skins. He experimented with plates of copper, zinc, tin, and lead. With the last the impressions were admirable, but the metal was not suitable to print from, as it soon became obscured by the printers' ink. In 1851 Dr. Branson of Sheffield, in a paper read before the society of arts, announced his having experimented with the electrotype process for producing plates of a harder surface. He also had obtained in gutta percha impressions of parts of plants, and, using the gutta percha as a mould, had reproduced the figures in brass. Prof. Leydolt, of the imperial polytechnic institute at Vienna, as early as 1849 had directed his attention to the production by similar means of correct copies of the polished surfaces of agates and various fossil remains. The agates, he found, when etched with fluoric acid, were acted upon by the acid unequally upon the different lines, and the surface being then inked, a faithful impression of the lines could be taken. But he perfected the process by taking the impression in a plastic composition and electrotyping this, thus obtaining suitable plates for printing from, as in the electrotype applied to stereotyping. In the same institution impressions were taken in 1852 of lace on plates of metal, and by the suggestions of Haidinger and Abbate portions of plants, polished sections of wood, &c., were copied by pressure upon plates of lead, which, being afterward moderately heated, were easily
freed from the fragments of the more
objects. An electrotype was then
copper, which, excepting the colors,
perfect facsimile of the original. To
the colors, these were applied to the
printed off all at one impression, care
taken in laying them on to go first over
parts that should receive the darke
and then to apply the next lighter co
so on. The plate is then placed up
perplate press, the upper roller of
covered with 5 or 6 layers of finely
blanket stuff. These operations were
fully prosecuted by Andreas Worring
imperial printing office, and in 1853 the
were presented to the public in 5 larg
volumes, containing 500 plates, with
volume of text and more plates, entitle
siotypia Plantarum Austriacarum.
prints of plants are others of agates
lace, wood, and other objects. Copies
work were presented by the Austrian
ment to various public institutions, and
others to several libraries in the United
A work of similar character was prin
London in 1855, entitled "The Ferns of
Britain and Ireland," by Thomas Moore
by Dr. Lindley, and the mechanical
by Mr. Henry Bradbury. The art has
perfected by the increased skill in color
plates and by the deposition of nickel
surface of the electrotype plate, the
which is to increase its hardness and dur
The impressions now obtained are so
that except by close inspection it is not
perceived by the eye, even when aided
touch, that the objects are not real ins
copies.—*Printing Presses.* The only
absolutely necessary for printers is the
press, invented about 1450. A specim
these rude, unwieldy machines, is the
used by Benjamin Franklin, now in the
office at Washington. The frame is a
bench some 2 feet wide and 5 feet lon
each side of this table, at a distance of
inches, there is a vertical post strongly
The two posts are united at the top by
beam, and through this beam plays
wooden screw. The screw moves a pla
tached to its lower end and free to
and down between the posts. The under
face of this platen, being intended to
paper against the types, is carefully
The pitch of the screw is such that a
of a turn raises the platen sufficiently.
screw is turned by means of a long bar
ing the head of the screw, or by means
hand lever having its fulcrum on one
posts, and so arranged as to multiply the
sure which is applied to it by the pres
when the platen is brought down. On
side of the table from one end to the other
rails, and on these rails is a carriage calle
bed. The bed is intended to receive the form
type on its upper surface, and is in conseq
made of hard wood or of stone, and

ned. The bed is moved alternately from end of the table, where it stands under platen, to the other end, by means of a ll axle placed crosswise under the bench, l provided with a crank on the side where pressman stands. On the end of the bed thest from the platen is hinged a quadrangu- frame of wood or iron called the tympan, l on the end of the tympan is hinged an- er frame called the frisket. The outer edge the tympan is solid; the inside is of cloth parchment doubled, with a woollen blanket ween. The frisket is a similar but more nder frame, filled in with a piece of thick er, and its object is to hold the sheet to be nted against the tympan. The object of the pan is to carry the sheet and to form a surface between the paper and the platen, as to equalize the pressure. It also serves register; that is, it carries marks or pins by ans of which it is easy to place the sheets ays in the same position, and thus have the rgins all equal and the printing correspond both sides. The press is also provided with counter weights, the one to raise the plat- the moment the pressman lets go the lever, other to turn back the axle and bring the l under the press to the end of the bench ich is free. There is an inking table con- ing of a flat surface, with two elastic balls, e for each hand, about 8 inches in diameter, vided with a short handle and covered with skin, which was most effective when partly ten. A small quantity of ink was placed on inking table and spread in a thin layer, ence it was taken up evenly on the balls by ing and rocking them on the table and inst each other, and then applied to the e in a similar manner, each time an impres- n was to be taken. The manner of using hand press is as follows. The form is made on the bed in the proper position, and the pes are inked. The frisket is folded on the pan, and the tympan is folded on the bed, that the frisket is between the types and the pan. The bed is brought under the platen, this last is pressed down by pulling on the er. Then the pressman lets go the crank the lever, when the counter weights will e the platen and bring the bed from under The pressman unfolds the tympan and the ket, and finds on the last an impression n the types. All the portions of the frisket ich have been printed upon are cut away, all is ready for printing, which is effected ist described, after placing the sheet to be ted between the tympan and the frisket. hand press of the kind described was gener- y worked by two men, the one attending to inking, the other placing the paper and ing on the lever to make the impression; they were able to produce 200 copies print- on one side per hour. The first improve- nt on the hand press was made in England Earl Stanhope, in 1815. It consisted in ilding the whole of iron, and substituting for the screw an obtuse-angled jointed lever, producing a progressively increasing pressure. The second improvement was made about the same time by G. Clymer of Philadelphia, who also used iron and a combination of levers; his press was called the Columbian. The third improvement is due to M. Gannal, a glue manufacturer of Paris, who, being applied to by a printer named Chegaray for a substitute for the putrid dog skin balls, devised the gelatine rollers, made of a mixture of molasses and glue, which are now universally used. With these improvements, and the minor devices which have been introduced since that time, it is now possible to print by hand at the rate of 250 impressions an hour.—Toward the end of the 18th century it was already felt that the hand press would soon be much too slow for the wants of the craft, and inventors began to devise presses to be moved by power. The first published invention in this department is that of William Nicholson, patented in England in 1790. The types were placed around a revolving horizontal cylinder, and were inked by rolling against another cylinder revolving in contact with the first. The ink was distributed on the inking cylinder by means of several inking rollers, the last of which revolved near the ink fountain. A third large cylinder covered with felt, and revolving in contact with the first, produced the impression, which was thus made by rolling the sheets of paper between two cylinders. Nicholson failed in attaching the types to the cylinder, and gave up his plan; but had he succeeded in this particular he would have found his inking arrangement entirely impracticable, the gelatine rollers as yet not having been invented. Friedrich König, a printer of Saxony, began to devise improvements in printing presses in 1804. Finding no help from capitalists on the European continent, he went to London, where he succeeded in interesting Messrs. T. Bentley and R. Taylor in his views. In 1811 he obtained a patent for working an ordinary hand press by power, but this failed in practice. Messrs. Donkin and Bacon, after experimenting for several years, succeeded in 1813 in building for Cambridge university a machine on Nicholson's principle, but for the type cylinder was substituted a quadrangular solid, on the 4 flat faces of which the types were placed, and wedged tight, as on the table of the ordinary hand press. The inking rollers had a lateral motion, so as to be always in contact with the types, and the printing cylinder was indented longitudinally in 4 places to receive the corners of the type carrier, and was cam-shaped so as to press the paper against the types. This machine was found too complicated in general, and the inking arrangement was unsatisfactory. Meanwhile Mr. König, with the help of A. F. Bauer, likewise a German, a native of Stuttgart, and a machinist by trade, had discovered that the way to make a press with a flat bed work rapidly was to apply

the pressure with a cylinder instead of a flat surface; he built a machine secretly, and on Nov. 28, 1814, "The Times" newspaper of London informed its readers that they were reading for the first time a sheet printed by steam. In this machine the form of types was made to move horizontally under a printing cylinder; the inking apparatus was placed in front of the printing cylinder; the ink was in a long horizontal cylinder, and by means of a tight piston was made to drop regularly through small holes on the under part of the cylinder between two iron rollers, from which it was distributed by other rollers, having a rotary and a longitudinal motion, to two larger rollers covered with leather, under which the form moved to be inked. This first press was further improved by placing a printing cylinder on each side of the inking rollers, thus getting two copies for each change of motion of the form. The number reached was 1,800 impressions per hour. Mr. König soon after made a machine for printing both sides, which was nothing more than two presses combined in one, the paper being carried from one to the other by S-shaped tapes. The inking arrangement of König's machines was far from perfect, sometimes losing two hours in getting started. Mr. Cowper in 1815 patented a process for curving stereotype plates, and fastening them on a cylinder; but the most important part of his patent was the invention of the inking table. The cylinders were about 5 feet in diameter, and only a small portion of the periphery was covered by the stereotype plates, the rest being used for distributing the ink. For this purpose several distributing rollers were disposed over the type cylinder in a frame movable on hinges, in such a manner as to come successively in contact with the types and with the part of the cylinder of a smaller diameter used as a distributing table. The ink was carried from the fountain to the table by another set of inking rollers. A few of these machines were built for and used at the bank of England. The next improvement was made by Cowper, associated with Applegath; it consisted in applying the distributing table to a flat bed press; part of the bed supports the types, and the other part serves as the distributing table. These machines were perfectly successful, and are now used all over the world. Some have one cylinder and print one side, and some have two cylinders and print on both sides. The momentum of the moving bed is overcome at each end of the stroke either by metal springs, or by an air spring consisting of a piston attached to the frame entering a cylinder attached to the moving plate. In 1838 a faster press was built for the "Times" on the same principle by Cowper and Applegath. By reducing the size of the printing cylinder to 6 inches diameter, they succeeded in crowding 4 into the same space previously occupied by 2, thus producing twice as many copies with the usual velocity. These printing cylinders were fed by means of tapes from feeding boards overtopping each other. This machine
off 6,200 copies per hour, and worked da
more than 10 years.—While they were p
ing cylinder presses in England, Isaac Ad
of Boston, Mass., took up the problem sta
ed by König of working a hand press by
and succeeded in making the machine de
in his patents of 1830 and 1836. The pl
stationary; the bed, situated directly u
the platen, has an up and down motion
few inches, but no horizontal motion. In t
of the bed is a large inking roller re
constantly. The tympan has a horizon
tion, and carries a small inking roller w
is brought at each stroke in contact with
large inking roller, and rolls back over
types. The tympan is also provided wi
fingers which take hold of the edge o
sheet to be printed, and carry it betwe
bed and the platen. The printed sheet
ried away by tapes, between which the
of the paper is blown by means of a blow
an air pump. The printed sheets are take
the tapes and piled up by a fly, a sort of
made of light wood, and carried on a r
shaft. The prongs of the fork, which
long as the sheet is wide, enter betwee
tapes, and, at the proper moment wh
sheet is above them, rise suddenly, desc
a half circle, and depositing the sheet o
receiving table on the other side of the r
shaft. Among the secondary devices in
Adams's press, the most important is an ar
ment for instantly disconnecting the rod w
connects the bed with the main shaft, by
ing down a pedal which is under the f
the feeder. Thus, if the feeder is not r
with the sheet, he presses the pedal, and
bed being disconnected remains stationary.
back printing is avoided. These press
worked at three different velocities, and
age 900 copies an hour.—The object of th
ventors of power presses was speed, and
this reason several attempts were mad
carry the types on a cylinder, and thus sub
tute a continuous for an alternate motion
the bed. It was reserved for an American
make the first successful type-revolving p
Richard M. Hoe of New York, after
costly unsuccessful attempts, succeeded in
in making a perfect machine, on the cyl
of which the types are held by friction be
bevelled column rules. (See HOE, Ric
M.) In making this machine the inv
availed himself of previous improvements f
the time of Nicholson, namely, the g
rollers, the distributing table, the fly, and
the improvements in the processes of wor
metal and building machines in general.
10-cylinder presses, such as are used in N
York and London by the leading journals, s
off 15,000 impressions per hour. They
only employed for newspapers of large circ
tion.—The hand press most used in the U
States is called the Washington press;
a Stanhope press very slightly modified

Samuel Rust of New York, who obtained a patent in 1829. In England they use the imperial and the Columbian. In Germany and France they have other appellations for nearly the same thing. Hand presses are used in large offices where very fine and perfect work is wanted, or when very few impressions are to be struck; and they are used in small establishments where a power press is not required. The Adams press is used for fine printing; while the cylinder press is employed for common book work, for jobs, and for newspapers of small circulation. This machine is in great favor with printers from the fact that it gives good impressions when worked slow, though it can be worked very fast and still produce legible printing.—In the patent records of Europe and America will be found descriptions of many presses which we have not mentioned. Some have been built and used for a time, and some include important devices which may be of service for future improvements. The press used for taking impressions from engraved plates consists of two parallel rollers pressing the plate and the paper between them. The rollers are turned by cranks. Another kind of printing machine was invented in 1858 by Dr. S. W. Francis of New York for the use of the blind. It consists of a key board, each key acting on a hammer on which a letter is engraved. The letters are printed on two movable sheets of paper, two copies being produced at once.

PRINTING, Calico. See Calico.

PRIOR, the superior of a convent of monks. A claustral prior is one who governs under an abbot, by whom he is removable at pleasure; a conventual prior is one who has no officer over him, and his convent is called a priory.

PRIOR, Matthew, an English poet, born at Wimborne-Minster, Dorsetshire, July 21, 1664, died at Wimpole, a seat of Lord Oxford, Sept. 18, 1721. He was educated at Westminster, under Dr. Busby, and at St. John's college, Cambridge, where he was graduated in 1686. Here he formed an intimacy with Charles Montague, afterward earl of Halifax, with whom he wrote "The City Mouse and Country Mouse," in ridicule of Dryden's "Hind and Panther." In 1691, through the influence of the earl of Dorset, he was appointed secretary of the embassy at the Hague, and so recommended himself to the favor of William III. that he made him one of the gentlemen of his bedchamber. When Queen Mary died in 1695, Prior wrote an ode upon the event, and in 1697 was appointed secretary of the commissioners who concluded the treaty of Ryswick. In the following year he was employed as secretary of the embassy at the court of France. In 1699 he was made under secretary of state, but losing his place shortly after, received in 1700 the appointment of commissioner of trade. In 1701 he was a member of parliament from East Grinstead, and soon after changed his politics, becoming a violent tory. He celebrated the victories of Blenheim and Ramillies in the opening years of the reign of Queen Anne, and in 1711 was sent on a private mission to Paris with proposals of peace. The negotiations began at Utrecht, but proceeded so slowly that Bolingbroke went to Paris as ambassador to hasten them; and Prior, who was in company with him, after Bolingbroke's return became the ambassador, but did not publicly assume the title until the departure of the duke of Shrewsbury, who "refused to be associated with a man so meanly born." When, in Aug. 1714, the whigs had regained office, Prior, was recalled, and had no sooner returned than he was arrested on a charge of treason. For two years he remained a prisoner in his own house, and employed his time in writing "Alma, or the Progress of the Mind." After his release he had no fixed means of subsistence except his fellowship at Cambridge, but he was rendered comfortable for life by publishing his poems by subscription, through which he realized 4,000 guineas. He was buried in Westminster abbey, and a monument was erected to his memory, for which he left £500 in his will. After his death a "History of the Transactions of his Own Times" was published (2 vols., 1740); but although Prior had been making preparation for such a work, there was little in it of his.

PRISCIANUS, a Roman grammarian, who lived about the latter half of the 5th century A. D. From his surname Cæsariensis it is supposed that he was born or educated at Cæsarea. He was a pupil of Theoctistus, and taught grammar at Constantinople. No other particulars of his life are known. His work on grammar is entitled *Commentariorum Grammaticorum Libri XVIII.* It contains a large number of quotations from Greek and Latin writers not otherwise known, and a parallel between the Greek and Latin languages. He also wrote a "Grammatical Catechism on 12 Lines of the Æneid;" a "Treatise on Accents;" one on "The Metres of Terence;" and some short poems, beside several translations from the Greek; and the acrostics prefixed to the plays of Plautus are ascribed to him. His name is familiar in the phrase *diminuere Prisciani caput* (to break Priscian's head), commonly applied to those who use false Latin.

PRISM, in geometry, a solid bounded by plane faces, of which two that are opposite are equal, similar, and parallel, and are called the bases of the prism; the other surfaces are parallelograms. The axis is the line connecting the centres of the bases. The prism is triangular, square, pentagonal, and so on, according as the figure of the bases is triangular, square, pentagonal, &c. It is right or oblique according as the sides are perpendicular or oblique to the bases. A right prism is regular when its bases have the figure of a regular polygon. The prism corresponds among bodies with plane surfaces to the cylinder among bodies with curve surfaces.—In optics, a prism is a portion of a refracting medium bounded by two plane surfaces inclined to one another. The line in which these two surfaces meet, or would meet if produced, is the edge of the prism; their inclination is called its refracting angle. The form commonly used is a triangular prism of glass. A good contrivance for delicate experiments may be made with two rectangular pieces of plate glass firmly set to form two sides of a triangular box which is to be filled with water or spirits of turpentine. The prism is an essential part of all apparatus for decomposing light.

PRISON, a building used as a place of penal confinement and safe keeping. From the earliest periods we find references to the prison, not as a place of punishment, but as a place of custody and detention. It is first mentioned in Gen. xxxix. 20, where Joseph's master is said to have "put him into the prison, a place where the king's prisoners were bound." The Philistines put Samson in prison, "and bound him with fetters of brass, and he did grind in the prison house." There is no evidence that the Jews had any prisons till the times of Ahab and Asa, and even then their prisons were, like those in most of the oriental countries from that time to the present, strong rooms or dungeons in the residences of high officers of state. The Greeks had a great repugnance to prisons, and debtors to the state were the only persons detained in them, except those awaiting trial. After the Romans conquered Greece and the countries adjacent, the prison seems to have been sometimes used as a house of detention and temporary confinement, something like our police prisons; such was probably the case with the prison at Philippi, whence Paul and Silas were released by a miracle. In Rome, the most diligent antiquarian research has been able to discover but one prison, that now known as the Mamertine caves, and supposed to be the same mentioned by several classic writers as the Tullian prison. It consists of two rooms or vaults, one 33 feet by 22, the other a semicircle of 22 feet radius. They were close and not ventilated, and life could have been preserved in them but a short time. They were mainly used for prisoners awaiting speedy execution. Tradition asserts that St. Paul was confined here just before his death. There was another class of houses of detention, called *ergastula*, very numerous in Rome, which were used for the safe keeping of slaves. The usual mode of detaining a prisoner for trial was by chaining him by the hand to one or two soldiers; and convicts were banished to an island, or condemned to the quarries or the mines. The Justinian code makes but slight allusion to prisons; its penal inflictions were tortures, mutilation, or death. Cicero had said 6 centuries before: *Carcer non ad puniendos, sed ad continendos homines habui debet;* and the jurists of the later Roman empire agreed with him. It was forbidden to imprison women or soldiers; and the prison was regarded as only of occasional service, for temporary custody. The early Christians visited the inmates of the prisons, whose condition was often wretched enough, ministering to their wants, and even paying for the privilege of admission. At a later period the *fratres misericordiæ*, a benevolent order of monks, made this one of their duties.—The loss of caste in its three degrees, namely, of family position and authority, of citizenship, and of liberty, either of which might be inflicted as a punishment for crime, obviated to a great extent the necessity of imprisonment, either temporary or permanent, in the Roman empire. No such substitute, however, would answer the purpose of the feudal barons, who, on the dissolution of the western empire, became rulers over small districts of territory. They required strong castles to protect their territory from their enemies, and in the principal tower of these, called the *donjon* (whence our word dungeon), they generally built rooms for the confinement of their captive foes or refractory retainers. They did not attach the idea of punishment to this durance; that was inflicted by torture or starvation. These prisons were sometimes cut out of the solid rock, far below the surface of the earth, and being dark, often damp, and with little or no means of ventilation, it is astonishing that life could have been so long protracted in them as we know it sometimes was. There was a class of these dungeons intended to destroy life by the combined influence of starvation and suffocation. They were small and bottle-shaped, with narrow mouths at top, and the prisoner was let down into them. They were called *oubliettes*, or *vade in pace* (go in peace). The provisions of *Magna Charta*, protecting the subject from imprisonment otherwise than by due course of law, were intended to prevent arbitrary detention and cruelty; and the principle, once acknowledged, was insisted upon in numerous subsequent concessions wrung from the earlier kings of England, and in *habeas corpus* acts passed by parliament at a later date. The object of these acts was to protect the accused from long detention before trial, and the convict from neglect and cruelty while awaiting his sentence or execution. These objects, the latter especially, were not wholly accomplished, for, owing to the faulty construction of the prisons, which were mostly the castle dungeons, and the numerous abuses which had arisen, the most atrocious cruelties were practised, especially upon imprisoned debtors, as late as the reign of George I., and had not wholly ceased till the reign of George IV.—The idea of substituting confinement in prison for corporal violence dawned very slowly on the minds of legislators. Even Sir Edward Coke, in his "Commentaries," declared that the prison was a place of safe custody, not a place of punishment. The poor debtor, however, had long found that to him it was a place often of most cruel punishment, accompanied, when the malice or avarice of the keeper prompted, by tortures so horrible as almost to surpass belief.

In the reign of George II. a parliamentary inquiry was instituted into these abuses, which led to the indictment of two of the principal gaol keepers of London for murder. In the latter part of the 18th century John Howard commenced his investigations into the condition of the English prisons, the first results of which appeared in two acts of parliament passed in 1773, one abolishing prison fees (which up to that time had been exacted from all prisoners), and the protracted confinement of the prisoner until these were paid; the other providing for an improvement of the sanitary condition of gaols. In 1777 appeared the first work of Howard on prisons, "The State of the Prisons in England and Wales." The works of Beccaria on crime and punishment appeared about the same time on the continent; and in England Sir William Blackstone, Mr. Bentham, and Mr. Eden entered upon the work of prison reform in earnest. It was found that the most hardened criminals, and those comparatively innocent, and indeed often witnesses and persons falsely accused, were placed together without employment in a common room; that in some cases the two sexes were confined in the same cells, and usually the most depraved prostitutes were permitted to associate with girls hitherto chaste; that the gaol keepers were permitted to sell liquors to the prisoners, and often for money permitted the commission of gross crimes within the prison walls; that in consequence the prisoners confined for petty offences left the prison thoroughly educated in crime; that the prisons were badly ventilated and very filthy, and that gaol fever, a disease of terrible malignancy, often prevailed, causing at one session of the court, known as the "black assize," the death of 300 persons, among them the judge, jury, several of the lawyers, and other officers of the court; and that debtors often fell victims to this fever, and spread it through the visits of their families to other neighborhoods. Attempts were made to remedy these evils, by building better arranged gaols, which, by isolation of the prisoners, ventilation, and thorough purification, should prevent such disastrous results; but the government was occupied with transportation schemes, and these projects fell through. Early in the present century Mrs. Elizabeth Fry commenced her mission to the female prisoners in Newgate; and in 1818 Mr. (afterward Sir T. F.) Buxton published an "Inquiry whether Crime and Misery are produced or prevented by the present System of Discipline." From this work it appears that, notwithstanding Howard's exposures, Mrs. Fry's revelations, and the developments made by the committee of aldermen of London in 1815, the abuses of Howard's time still continued, and had in many particulars increased, and that a radical and thorough change was needed. In the conclusion of his "Inquiry," Mr. Buxton laid down certain principles as to the rights of the prisoner and of society, which, though in advance of his time, are of general application, and well worth quoting. A prisoner, even if convicted of serious crimes, he conceived to be entitled to pure air, wholesome and sufficient food, protection from cold, opportunities of exercise, the privilege of labor, and the devotion of a part of the proceeds of that labor to the support of his family, if he has one. Society has a right to demand that the prisoner shall be securely confined, and that he shall not be made worse either in body or character by his imprisonment; that his intemperance or other evil habits shall be restrained; and that education and religious instruction shall be provided for him. Mr. Buxton's remonstrances were more immediately effective than those of Howard and his coadjutors. The great penitentiary at Millbank, which holds 600 male prisoners, was commenced in 1819; and a committee was appointed in 1822 to revise the statutes concerning gaols and prisons in England and Wales. In 1835 an act was passed providing for inspectors of prisons to be appointed by the government; a law which has been of great benefit in opening the way for improvements in prison management and discipline. The Parkhurst prison for juvenile offenders was erected in 1838. In 1842, after examination of prison systems in other countries, the Pentonville prison was built as a model prison on the separate plan. Government prisons have since been erected at Portland, Portsmouth, Dartmouth, Chatham, and Brixton. The hulks of men-of-war, laid up in ordinary, were for a time used as prisons, but have now been abandoned as every way objectionable. Scotland, once much worse than England in the abuses of her prisons and the laxity of their discipline, has since 1839 been thoroughly reformed. In Ireland there has been much improvement in the prisons since 1826, though now there is more liberty allowed to the prisoners than would be deemed consistent or desirable in other countries.—Transportation, which is really a species of imprisonment, is so intimately connected with the history of prisons and prison discipline in Great Britain, that some account of it is necessary to a full understanding of the subject. The first instance of transportation of convicts from Great Britain occurred in 1619, when 100 were ordered to be sent to Virginia, and afterward small numbers were occasionally sent out and sold to the planters for 7 or 14 years, a practice often alluded to by Defoe and other writers; but the business was not conducted systematically till after the year 1718, when for a number of years as many as 2,000 convicts were annually transported thither. These were sold to the settlers for a term of years, and at the expiration of their time often became landed proprietors, and purchased the services of other convicts. The war of the revolution put an end to this traffic, and the British government was compelled to find a new outlet for its convict population. In 1786 it was determined to establish a penal colony in Australia, and the first cargo, of 850 convicts, was sent out in March, 1787, to Port Jackson, near Sydney. For some years there was nothing but disaster connected with this transportation. The convicts, stowed in large numbers on transport ships, died by hundreds of fever on the passage out; or if they arrived they were unable to earn a subsistence, and perished of famine, or, to preserve life, adopted the savage habits of the native bush rangers. At length the influx of free settlers, the extensive sheep culture, and the building up of large towns, made their condition tolerable; while the grants of lands to the emancipists, as those who had served their time were called, and the plan of allowing tickets of leave, which in some cases shortened their term of punishment almost one half, soon gave to the convict settlers a powerful and for a time predominating influence in the colony, which was exerted for evil. This led to the organization among the free settlers of a party opposed to transportation, which eventually became so powerful that the home government was compelled to yield to their demands, and in 1840 transportation to South Australia ceased. It was maintained on Van Diemen's Land till 1848, and in North and West Australia some time longer; but, with the exception of 200 or 300 sent to western Australia, it has now been entirely abolished. Its discontinuance involved considerable difficulty at home. The government was under the necessity of materially shortening the sentences of those who were committed to prison at home, instead of being sent to Australia; and the introduction of a ticket of license system, intended to watch over their conduct during the period which would have elapsed if they had been transported, produced a panic in the English community in 1855 and 1856. Of the convicts, of whom there are somewhat more than 6,000 in all, 3,300 or 3,400 are employed on the public works at Portsmouth and Portland, and in the dockyards of Dartmouth and Chatham. The remainder are in the Pentonville, Brixton, and other prisons.—In France, prisons were not recognized as places of punishment until after the revolution. Previous to that time, the galleys, the wheel, and the chain gang had been the principal modes of punishment. The prisons were as badly managed and as objectionable in their construction as those of England until after the restoration. Before this they had been of three kinds, the royal prisons, the prisons of the nobles, and the official prisons; and the greater part of them were castle dungeons. Within the last 25 years many new prisons have been built, and improvements have been made, but there is still freedom of intercourse between prisoners in most of them, and no labor except for convicts. The prisons of the country are now divided into 5 classes, viz.: 1, police prisons; 2, houses of arrest for those awaiting trial or sentence, and for those imprisoned for less than a year; 3, judicial prisons, for cases of appeal from the lower courts, for those imprisoned at the pleasure of the court, and for cases awaiting the judgment of the court of assizes; 4, houses of correction for juvenile offenders, and children whose parents are convicted of crime; 5, central prisons, or houses of detention and hard labor, answering to our state or convict prisons. There are 29 of the last. In all of them the contractor or his agent is allowed to keep a shop on the premises, and supply the prisoners with whatever they wish; and in the central prisons the prisoner has half his earnings to spend in this way, while the other half is reserved as a fund to be paid him at his discharge. The prisoners not frequently form associations in prison to carry on extensive robberies after their release, and the money they receive at their discharge affords facilities for this. In 1848 labor was abolished in all the prisons, on the ground that it interfered with the industry of honest citizens; it was reëstablished in 1852, but the products of the labor are purchased by the state for its public institutions. In 1852 transportation to Guiana and Lambessa in Algeria was introduced, and is still the principal punishment of political offenders.—In Germany generally the prisons are said to be well managed. In Prussia the management of all the prisons of the country has been confided, since 1850, to Dr. Wichern, the founder of the inner mission and the rough house reformatory at Horn, who, as inspector-general, with full powers, has improved the discipline, and placed over each a warden or director, and subordinate officers trained for the purpose, and selected with great caution and discrimination, in the belief that more depends upon the personal character and adaptation to their work of the keepers of prisons than upon systems of discipline, forms of buildings, and all other arrangements together. The results which have followed these changes are said to be in the highest degree satisfactory.—In the United States, the prison has been considered a place of punishment almost from the first settlement; and though mutilation, branding, and corporal punishments prevailed in the early history of the country as penalties for some crimes, and still find a place on the statute book of some states, they are now seldom inflicted. The convict prisons were in a horrible condition prior to the revolution; but since 1786 reforms have been going on in the larger states, and most of the state prisons would compare favorably, probably, with those of most other countries, though in some of them cruel punishments are yet resorted to, and too little discrimination is used in the appointment of wardens and keepers. The larger cities have usually penitentiaries for the punishment of offenders sentenced by the municipal courts, as well as houses of detention or police prisons, to which those awaiting trial r sentence are committed. These are generally well constructed. The gaols erected by the counties are in many instances badly constructed, injudiciously situated, and in charge of unfit keepers. The efforts of the New York prison association, the late Boston prison discipline society, and the Philadelphia society for alleviating the miseries of public prisons, and their reports of the condition of the prisons and gaols throughout the states, have been productive of much good in the diffusion of correct notions on the construction and management of these institutions; and where new prisons are erected, they are generally constructed on better models.—When, in the latter part of the last century, imprisonment came to be regarded as in itself a punishment, and as such entitled to take the place of the cruelties and indignities which had previously been inflicted upon the person, the question of the best plan of organization and discipline for such institutions at once became one of great importance. Men like Beccaria, Howard, Blackstone, Bentham, and Eden, at once perceived that the congregation of a number of prisoners in the same room, by day and by night, with no restraint upon their intercourse with each other, and no employment, took away from the vicious much of the terror of imprisonment, corrupted the inexperienced and comparatively innocent, afforded opportunity for education and combination in crime, and, instead of reforming the offender, turned him loose upon society at the expiration of his sentence a tenfold greater villain than when he entered the prison. While these evils were acknowledged, the most effectual remedy for them was not so easily devised. Various plans for the construction and management of prisons were proposed, but all, though containing many excellent features, were liable to serious objections. Mr. Bentham published in 1799 a plan of what he called a panoptic prison, in which every prisoner was to be confined in a separate cell, and each cell was so arranged as to be under the constant inspection, night and day, of guards in a central tower. This in its practical working was found to be a failure, and its ingenious author himself, we believe, admitted it to be so. Howard suggested some improvements in construction, which, though a material advance upon the prisons of his day, have proved defective in some particulars. One of the worst errors in his plans was the provision for lodging three prisoners in one cell. To devise the best plan for accomplishing the objects desired in imprisonment, safe keeping, moderate expense, determent from crime, maintenance of health, and the reformation and moral and intellectual improvement of the prisoners, has been a matter of earnest study and investigation on the part of many philanthropic and intelligent men, both in Europe and America, for the last 40 years. The first plan adopted, when public attention was called to the evils of congregating prisoners in masses without employment, was the solitary prison, first tried in the prison connected with the hospital of San Michele at Rome in 1703, but little known prior to the experiment in the Walnut street prison at Philadelphia in 1786. The peculiarities of this system were the complete isolation of the prisoner from all human society, and his confinement in a cell of considerable size, so arranged that he had no direct intercourse with or sight of any human being, and no employment or instruction. The quiet and order which were substituted for the disorder of the previous want of system, commended it at first to the public mind; and other prisons on the same plan, but less liberal in the size of their cells and the perfection of their appliances, were erected in Massachusetts, New Jersey, Maryland, and some of the other states; and in some instances, where it was not adopted for all the prisoners, cells on this plan were constructed for the worst criminals. But experience soon demonstrated that there were very serious objections to it. A considerable number of the prisoners fell, after even a short confinement, into a semi-fatuous condition, from which it was next to impossible to rouse them; others became violently insane; others still committed suicide; while those who stood the ordeal better were not generally reformed, and in most cases did not recover sufficient mental activity to be of any subsequent service to the community. The great cost of prisons constructed on this principle was another objection to it; and the prisoners being entirely unemployed, the whole charge of their maintenance came upon the state. It became evident that some changes must be made in the system. The "separate" system was originated by the Philadelphia society for ameliorating the miseries of public prisons, founded in 1787. Retaining the plan of continuous cellular confinement, it permits the prisoner to work in his cell, in some instances even encouraging him by reward for overwork; furnishes him with books, both for reading and study, and permits him to receive instruction in his cell, or, as in Pentonville, England, in a general school room, where however he is not permitted to see, though he may hear, his classmates; provides, under similar restriction, for his attendance upon a prison chapel, or at least allows the chaplain to preach in the corridor, so that all can hear at the same time; in some instances gives him a little garden to cultivate, and thus supply himself with some luxuries; permits the visits of the officers, chaplain, &c., to his cell, and to some extent of other people; allows him to correspond under supervision with his friends; and, at Pentonville and some other prisons of the class, provides such comforts and appliances in his cell as make it in itself more comfortable even than the sleeping rooms of persons of the middle classes generally. The advantages of this system are represented to be, that it individualizes the convict, and prevents his recognition by other prisoners who are confined with him, and who after his discharge might attempt to compel him to vicious courses by their knowledge of his previous disgrace; that it renders a large force of guards unnecessary, since combinations and conspiracies are impossible; that it also prevents his degradation by those severe personal indignities which are regarded as indispensable in congregated prisons; and that it gives him more opportunity for instruction and reformation, to which end the good influences to which he is subjected are supposed to contribute. Under this system, the general health of the prisoners is very good, and the mortality is less than in most congregated prisons. Insanity is not, according to the statistics of the past few years, any more prevalent among those confined in these prisons than among those in congregated prisons, and perhaps not quite as much so in this country. The first cost of construction, however, is even higher than in the solitary system, and the labor, though serving to occupy the mind of the prisoner, and defraying part of the cost of his subsistence, is still unprofitable, nowhere covering expenses. In Pentonville, in 1849, the average cost of supporting prisoners (including all expenses) is stated by Mr. Dixon at $250, while the earnings were less than $13. The Pennsylvania prisons do much better than this, but are still conducted at a heavy loss. While the prisoners are obedient and docile, quiet and well behaved, they lose to some extent their mental activity, and on their discharge a considerable number of them sink down into a semi-fatuous state, even when their confinement has been only of 18 months' or two years' duration. This occurred to such a degree at Pentonville, decidedly the healthiest and best managed of these prisons, that when the men, after 18 months' imprisonment, were removed on shipboard for transportation, they were found entirely incapable of taking care of themselves, becoming in a day or two light-headed, low-spirited, silly, and some of them subject to sudden faintings; and it was found necessary, for some weeks before shipping the subsequent companies, to bring them into association with each other, and encourage them to talk and be merry. Nor has it been found that, in cases of discharge, the reformations were so numerous as was to be hoped. If they retained sufficient vitality and intellect to be active, their activity has very often been for evil; if they were stupid and idiotic, they remained so.—The "silent" or Auburn system did not originate at Auburn, for in 1772 Howard saw it in practice at Ghent, and spoke of it approvingly. Not long after, however, this plan was abolished there by the emperor Joseph II., and the old *régime* reinstated. There is, however, little reason to suppose that Capt. Elam Lynds had any knowledge of the prison at Ghent, when in 1823 he made his experiment at Auburn, which up to that time had been managed on the solitary system. It is the purpose of the Auburn plan, equally with those we have already described, to prevent that intercourse between prisoners which experience has shown to be so productive of evil. It attempts to accomplish this by solitary confinement in cells at night, and by strictly enforced silence during the day in the workshops and the chapel. They are permitted, however, to address necessary inquiries to their instructors in the shops, and to the wardens and keepers, to converse with the chaplain, and to participate in the exercises of the Sabbath school, and in singing in public worship. The advantages of this plan were, a much less cost of construction, as the cells, having grated doors, and being only used as lodging and Sunday rooms, could be much smaller; greater efficiency and productiveness in labor, the result of working together, in many cases rendering the prison self-supporting, or even profitable to the state; and, it is stated in some prisons, a better physical and mental condition of the men on their discharge. It is also urged, though hardly demonstrated, that under this system moral and religious instruction can be more effectually conveyed. It is objected to it, that the prisoners know each other, and find means of communicating with each other; that there are consequently frequent outbreaks, which are impossible under the other systems; that the prisoner is more at the mercy and caprice of his keeper than in the other systems; and that the results, so far as escapes, deaths, and cases of insanity show, are less satisfactory than in the separate system. It is obvious that much more must depend upon the character and ability of the warden and keepers in this system than in those which we have previously described. The Auburn system, with some variations in matters of detail, and more or less strictness in the enforcement of silence, is now adopted in the state prisons of most of the United States, and in the principal penitentiaries or district prisons. It is also adopted in a considerable number of the county prisons, especially the larger and more recently erected. In England it is the system generally preferred in the county prisons and penitentiaries. It is also adopted in the 29 convict prisons (*maisons centrales*) of France. In Ireland, Belgium, Holland, Denmark, Sweden, and Norway, on the contrary, the separate system has the preference; while in Germany both are in use. In Italy there is very little system or order in the prisons, except in Sardinia, where some years since the separate plan was received with the most favor.—In England the relinquishment of transportation has been followed by some modifications of the systems we have described. These are due mainly to the influence of Major-General Sir Joshua Jebb, who has since 1837 devoted much attention to the construction and management of convict prisons, and is now chairman of the board of convict prison directors. His system recognizes 3 periods of probation for prisoners. 1. Imprisonment in a separate prison for 9 months. Prisoners are sent, when convicted, to Wakeield, Leicester, or Millbank, and thence drafted o Pentonville, where the separation is less severe than formerly, the prisoners seeing each other in the *yards* and chapel. 2. Associated labor, or penal servitude on the public works, at Chatham, Portsmouth, or Portland. The prisoners work in gangs at the quarries, docks, or fortifications by day, but are confined in separate cells at night. 3. A ticket of leave in W. Australia, or labor on free ground and in ordinary clothes, and lodging in barracks, under surveillance, at home. In all these periods, gratuities in food and money, the latter payable partly at their discharge, and partly, if their deportment is correct, 3 or 6 months after, are attainable by good conduct and industry. Marks of good conduct also shorten by some weeks or months the term of punishment. The system is well administered, but its results are unsatisfactory. The cost per head for the support of convicts is over $190, while their earnings do not exceed half that sum; there are frequent violent outbreaks at the government works, 7 occurring the past year, and the recommitments, amounting to nearly 25 per cent., though due in part to the better fare, &c., in the convict prisons than in the gaols, do not speak well for the reformatory influence exerted. The whole number of convicts in the 10 English prisons in May, 1861, was 7,065. The Massachusetts state prison has adopted a plan somewhat analogous to this, but a little more favorable to the prisoner. By continued good conduct, a prisoner may be credited with from 3 to 5 days on each month, according to the length of his sentence, and the term for which he is imprisoned is materially diminished in this way if his conduct is uniformly good. This plan is liable to some serious objections. A better one is that of intermediate prisons, now adopted in Ireland. A regular scale has been adopted, and the prisoner who is sentenced for 10 years may, after serving 6 years in a "separate" prison, if his conduct has been good, be then transferred to an intermediate prison, where he is employed with others who have behaved well; and if his deportment is exemplary, at the end of a year and a half he receives a ticket of license, which permits him to be at large, but under the surveillance of the constabulary, at whose offices he is registered; if he behaves well he is unmolested, but if he falls into vicious habits he is remanded to the separate prison, to serve out the remainder of his term. This plan has already been tested in the case of nearly 2,000 prisoners in that country, and, it is asserted, with more satisfactory results, so far as the reformation of the prisoners is concerned than any other.—Within a few years past considerable attention has been bestowed upon the condition of discharged prisoners. Through the efforts of the late Isaac T. Hopper the New York prison association was organized for the relief of this class, and with a small income has accomplished a large amount of good. A separate association has opened a home for discharged female prisoners. In Boston a similar organization exists, and a periodical called "The Prisoner's Friend" is published by the Rev. Mr. Spear. In London an association called the discharged prisoner's aid society has been formed for the accomplishment of the same purpose.—See John Howard, "The State of the Prisons in England and Wales" (1777), "Account of the Prisons and Hospitals in Russia, Sweden, and Denmark" (1784), and other works; Bentham, "The Panopticon, a Plan for a New Prison" (1799); "State of the Prisons in England, Scotland, and Wales," &c. (1816); "Considerations on Prisons, with Plans for their better Regulation" (1812); the Rev. J. Field, "Prison Discipline, with Arguments in favor of the Separate System" (London, 1848); J. Hepworth Dixon, "The London Prisons" (London, 1850); Schiermans, *Précis de droit criminel* (Brussels, 1852); "Reports of the Prison Discipline Society" (Boston, 1826 *et seq.*); "Reports of the New York Prison Association" (1844–'60); "Quarterly Journal of Prison Discipline," vols. i. to xv. (Philadelphia, 1845–'60); J. L. Tellkampf, LL.D., "Essays on Law Reform, Penitentiaries, &c., in Great Britain and the United States of America" (London, 1859); Holtzendorf, "The Irish Convict System" (London, 1860); W. Parker Foulke, "On Cellular Separation" (Philadelphia, 1861); De Beaumont and De Tocqueville, *Du système pénitentiaire aux États Unis, et de son application en France*, translated by Dr. F. Lieber (New York, 1833); M. Berenger, *Repression pénale* (Paris, 1855).

PRIVATEER, an armed private vessel which bears the commission of a state to cruise against the commerce of its enemy. When one sovereign has duly declared war against another, all the subjects of the former are enemies of all the subjects of the latter. From this principle of the law of nations follows the unquestionable corollary, that no citizen of one of the belligerent states can complain of the hostile acts of any citizen of the other. Therefore, as far as absolute international rights are concerned, it makes no difference whether a depredation or capture by a subject of the enemy has or has not been expressly sanctioned by his sovereign. The universal practice of nations, however, condemns all unauthorized hostilities; and a capture or other hostile act without the sanction of a competent sovereign power, although, strictly speaking, it would not be piracy, yet would be so much like it, or so irregular and odious, that it would unquestionably provoke the severest treatment at the hands of an enemy against those who engaged in it. Yet, though unauthorized capture of enemy property is no offence under the law of nations, it is an infraction of the public law of the captor's own state. For the universal rule is that, except in self-defence, only those subjects may take part in hostilities who are thereto expressly or constructively authorized by their sovereign. In him alone resides the power of making war.

In the exercise of it he may employ what means he pleases. He may limit himself to his own ships, or he may resort to those of other states. Of the former he may employ only his public vessels, or he may avail himself of the private vessels of his subjects by commissioning them to seize the merchant ships of the enemy. These commissioned private ships or privateers are in naval warfare much the same as the volunteer corps are in the land service. In both cases the commissions proceeding from the sovereign make those who bear them the instruments and servants of the state. On the sea it is the letters of marque which give that interest in the prize which is the inducement to engage in the service. For, primarily, all prizes vest in the state, and it is the commission alone which, under the municipal regulations of each state, defines the proportion of the captured property and the other rewards which shall fall to the privateersman. (See PRIZE.) To guard against the excesses and abuses which are incident to privateering, it has been subjected to various restrictions. Some states have regulated the composition of the crews, and have forbidden all cruising in the rivers or along the coasts within the sea line of the enemy. Generally commissions are granted on condition that the rights of neutrals shall be respected, and that belligerent rights shall in all cases be enforced according to the rules of war; that prizes shall be brought for adjudication before the proper tribunal; and that the whole conduct of the cruise shall be confined to the instructions of government. Bonds are taken for the due performance of these engagements, and owners and officers are subjected to penalties for the violation of them.—Privateering may be regarded in two aspects, or rather it may be said that there are two kinds of privateering, one of which is far more legitimate and defensible than the other. The former of these kinds is that in which the citizens of one of the states at war sail under their own flag against the enemy. They find employment in this way for the ships which during war must almost of necessity be withdrawn from trade; and they contribute very materially to the maritime strength of their state. In such a country as the United States, which from various motives maintains an inconsiderable navy compared with those of the great maritime powers of Europe, the assistance of the mercantile marine would be in case of war almost indispensable. In fact, making war vessels of merchantmen would be nothing else than the creation of an adequate naval fleet. This sort of privateering the United States has always defended and encouraged, though, as will be presently seen, it has professed itself willing to surrender on fair conditions even this manifest and just advantage. The other and more odious form of privateering is that in which a neutral accepts a commission from one of two belligerents. Here the legitimacy of the practice is not so clear, at least so far as affects the neutral. He can certainly have no patriotic motive in accep such a commission. Such a motive is probably even when the privateer sails the flag of his own country; but the country does really derive some benefi the service. In the case supposed, the is a sort of legalized pirate, and so indeed regarded by those conventions and trea which, in condemnation of this abuse of international laws of war, almost all na have entered into. The French *ordonnance la marine* expressly declared such practi be piracy. The treaties between France Holland in 1662, between the United S and France in 1789, of the United States England in 1794, with the Netherlands 1792, with Prussia in 1785 and 1799, and Spain in 1795, with Sweden in 1783 and all declared that if any citizen of either tracting power should take letters of marq carry on privateering against the other any power with whom the other was at he should be treated as a pirate. The practice of nations also accords with the of these express compacts. In the war Mexico, England and France forbade their jects to accept the privateering commis which were offered by that power. So in late Russian war, the neutral European st prohibited their subjects from taking par the war, either by accepting letters of mar or otherwise aiding the belligerents. Aus Denmark, and Sweden and Norway exc privateers from their ports. The foreign en ment acts of Great Britain and the United Sta are permanent statutes, which impose seve penalties on citizens or residents who recei commissions, equip privateers, or enlist men service in any foreign war. This species privateering seems to be well nigh repres Not so the other. For nearly a century the pediency of its suppression had been at intervals elaborately discussed; yet in all that period but little advance had been made tow the settlement of the question. In 1856 subject was revived at the congress which convened at Paris after the Russian war, and the states there represented made mutual engagements to surrender the practice of privateering. The United States still maintains its old position. As early as 1785 (to review briefly the doctrine and practice of our government upon this matter) the United States made an effort to abolish privateering. In that year, and while he was negotiating with Prussia the treaty which was afterward concluded, Dr. Franklin wrote: "The United States of America, though better situated than any European nation to make profit by privateering, are, so far as in them lies, endeavoring to abolish the practice, by offering in all their treaties with other powers an article engaging solemnly that in case of future war no privateer shall be commissioned on either side, and that unarmed merchant ships on both sides shall pursue their voyages unmolested." Dr. Franklin procured sertion of both these propositions in the y with Prussia. In the subsequent treaty 790 with that power, however, all provi- of this character were omitted. In 1792, y be mentioned in passing, the legislative ably of France proposed that nations should e by mutual conventions to abolish pri- ring and the seizure of private property on cean. The proposal met but little favor, these practices were perhaps never more sively carried on than during the wars h followed the French revolution. Again 24 the subject was revived, when, on our again, it was urged upon the attention of English government. The plenipotentia- Messrs. Huskisson and Stratford Canning, lined however to entertain the propositions or minister, Mr. Rush, and he reported to ernment that in his opinion Great Britain unwilling, under any circumstances, to ac- to the abolition of private war upon the n. But a radical change in the sentiments nglish publicists upon this question is in- ted, it would seem, by the language of Lord endon in 1854. In submitting to our am- dor, Mr. Buchanan, the declaration re- ting neutrals which France and England rward issued, the British minister advocat- the abandonment of privateering, and ex- ed his condemnation of the practice as one h was "inconsistent with modern civiliza- ." Mr. Buchanan replied, that under exist- circumstances it did not seem possible for United States to agree to a surrender of the tice, unless the naval powers of the world ld go one step further and consent to the ition of all war against private property n the ocean, as was already agreed upon as private property upon the land. In answer Mr. Buchanan's despatches, Mr. Secretary cy reminded the British government that United States laws go as far as and even ther than those of any other nation in pro- iting its subjects from entering into foreign ateer service; but he added that the coun- would not enter into any convention where- it would preclude itself from resorting to its chantmen in case of war. Finally the sub- sion to our government of the declaration ich was signed at Paris in 1856, by the plen- tentiaries of the chief states of Europe, led for a new consideration of the question. ide provisions affecting the rights of neu- ls, the convention contained an article which clared that privateering was abolished. The r points of the declaration were to be re- ded as an entirety; they were to be binding ly between those powers which assented to m; and the states that signed the conven- n undertook to invite the accession of those wers which were not represented at the con- ss. Most of the secondary states of Europe d America gave prompt adhesion to the ar- les of the declaration. The United States lined to do so. It objected to the privateering clause, and alleged the same grounds of objection which it has always urged. The answer of our government to the declaration was, through Mr. Marcy, that the United States would accept the whole of it "in case the clause abolishing privateering were amended by adding that the private property of the subject or citizen of a belligerent on the high seas should be exempted from seizure by public armed vessels of the other belligerent, except it be contraband of war."

PRIVET (*ligustrum vulgare*, Linn.), the ordinary name of a half evergreen shrub used for live hedges. The common privet belongs to the natural family *oleaceæ*, trees or bushes having simple, mostly entire leaves, perfect or polygamous flowers with calyx and corolla, and the fruit either a berry or a drupe. (See OLIVE.) The genus *ligustrum* is distinguished by its short, tubular, 4-toothed calyx, and funnel-shaped, 4-lobed corolla, the tube exceeding the calyx; the stamens are 2, inserted into the tube; the style very short, stigma obtuse, bifid; berry globose, 2-celled and 1-seeded; albumen somewhat hard; embryo inverted. The common privet, also called prim, occurs in pastures and fields in eastern New England and in New York. It is a hardy shrub with numerous branches, growing in clumps from strong, matted, yellow roots, and rising to the height of 6 to 8 feet. The leaves are small with very short petioles, opposite or crowded in tufts, lanceolate-acute at both ends, entire, pale green, and smooth on both sides. The flowers are borne upon short terminal panicles, the calyx short with 4 very blunt teeth, the corolla a short tube with 4 oblong, expanded pointed segments; the tube encloses 2 very short stamens with large sulphur-colored anthers, whose pollen is fragrant; the berry is of a polished black color and very conspicuous in winter. The foliage turns rusty and shrivels, falling off as the cold becomes severe; but when in full leaf and flower the shrub is pleasing to the eye.—The privet is raised from the seeds. The method generally considered the best is to gather the berries as soon as mature and place them in a heap to rot, sowing the seed in the spring; others advise that the berries themselves be sown at once. The usual mode of propagation in Europe is by cuttings, which root easily. The plants flourish especially in a strong, loamy, moist soil, but they will grow in almost any kind, and even under the shade and drip of deciduous trees. If intended for low trees, the side shoots should be rubbed off; otherwise they require very little pruning. When set out for live hedges in a good soil and sheltered situation, the foliage sometimes survives the winter. Scarcely any other shrub forms so beautiful a low hedge, and few are so exempt from disease or from the ravages of insects. The wood of the privet is hard and close-grained, and when of sufficient size is fit for turning in the lathe; it also makes a superior charcoal for the manufacture of gunpowder. The leaves and bark are bitter, and the smaller twigs clipped in June, dried and pulverized, are used in some parts of Europe for tanning leather. The young slender branches and shoots are employed like osiers for basket making and for tying packages. The berries afford a rose color which is used in tinting maps and prints; they are also eaten by several kinds of birds. A greenish oil fit for lamps or to make soap is extracted from them by pressure.—There are several varieties of the common privet, such as the white-berried, yellow-berried, green-berried, the narrow-leaved, and the variegated leaved; but the most desirable of all, especially for live hedges, is the Italian or evergreen. The spike-flowered privet (*L. spicatum*, Hamilton) is a native of the mountains of Nepaul, a shrub 6 or 8 feet high, with elliptical acute leaves, which are hairy on their lower surfaces; the flowers crowded, almost sessile, disposed in a thyrse, white, appearing in June and July. The wax tree (*L. lucidum*, Aiton), so called from excreting a waxy matter, is a small tree 10 to 20 feet high, with broad, ovate-oblong, acuminate leaves, shining on their upper surfaces, the flowers in thyrsoid panicles, white. It is a handsome object when trained to a single stem, and may be propagated by layers, cuttings, or by grafting upon the common privet. It is a native of China. Other species are known indigenous to Japan, China, and the East Indies.

PRIVY COUNCIL. See Council.

PRIZE, any property captured at sea in virtue of the rights of war. A difference exists in practice between war on land and on the sea in respect to private property. On land private property, with some exceptions, is respected by all civilized nations; but at sea all the property of every citizen of a belligerent country is liable to capture.—The general rights of a belligerent are to make captures by his public armed vessels of war, to grant commissions to private persons for the same object, and to establish tribunals of prize for the purpose of examining into all maritime captures, and of judicially deciding upon their validity. By the declaration of war all the citizens of the belligerent countries respectively become enemies, and the citizens of one country may seize any property of the other that they may meet with at sea. Property however so seized belongs to the sovereign of the country, and not to the captors, except it is given to them as an act of grace on the part of their sovereign. For this reason, and also that the government of the country may have the power to limit and control the operations of the war, commissions are usually granted by the government to private persons authorizing them to make such captures, and after adjudication by a competent tribunal they are entitled to the proceeds of the prizes thus taken. (See Privateer.) It is obviously necessary that when a capture has been made there should be some tribunal with authority to pass upon the validity of the capture, and to pronounce a decree of condemnation or acquittal. It is therefore the right and duty of the government of a country, on the declaration of war, to establish tribunals of prize; and is then responsible to all foreign nations for the correctness of the decisions therein made. So far as the property in question is concerned, the sentence of the prize court is conclusive upon all the world. If the sentence is of condemnation, the title of the former owner of the property is divested, and all nations are bound to respect the new title acquired under it. To give the decision of the court this effect, however, it must appear conclusively that the court had jurisdiction over the property in question. The court must be established in the country of the captor, or in that of his ally in the war, but it is not necessary that the prize should be brought within a port of either of these countries. It is the practice of Great Britain and of the United States to adjudicate upon captures which have been carried into a neutral port.—The next question to be considered is: Who are enemies, and what property is liable to capture? For this purpose not only the native-born citizens of the belligerent are considered as enemies, but all persons who have their domicile in the hostile country, and the citizens of a country which is under the permanent or temporary dominion of the enemies of another country, are considered as citizens of the latter, and all trade with them is illegal, unless the government chooses to recognize the country as neutral, in which case courts of justice are bound by such recognition. It is very doubtful whether a citizen of one country can expatriate himself on the breaking out of war, in order to acquire neutral rights and privileges; but it is certain that if he removes in order to mask his mercantile projects under a neutral flag, such an act is fraudulent and of no avail. But if he has removed during peace, and acquired a domicile in a foreign country, he may engage in trade with a country which is at peace with his adopted country, although at war with that of his nativity. The question of the domicile of a person is generally to be determined by his intention. Thus if he goes to a foreign country for a temporary purpose, with the intention of returning after accomplishing his object, he would not acquire a domicile there. If, however, he should remain there a long time, this would be evidence, though not conclusive, of his intention to make that country his domicile. If it sufficiently appear that the intention in removing was to make a permanent settlement, or for an indefinite time, the right of domicile is acquired by a residence even of a few days; and a neutral or subject found residing within a foreign country is presumed to be there *animo manendi*, and if a state of war should bring his national character into question, it lies upon him to explain the circumstances of his residence. If a person becomes a citizen of another country by naturalization or residence, his native nationality easily reverts; but a mere visit to his original country

d not reintegrate him as a subject of that
ry, if such visit was intended to be of
t duration only. A citizen of one country
ing and doing business in another, resumes
tive character if, on war breaking out, he
himself *in itinere* to return to the country
birth or adoption; but the mere inten-
without some overt act is not sufficient.
an may have a neutral residence, and yet
property may acquire a hostile character.
he may be a merchant in more countries
one, and may thus acquire at last a *quasi*
icile beside that of his birth and parentage;
this would be respected by the law, pro-
d there was no indication of fraudulent in-
ion, that is, of giving himself two national
acters, between which he could choose
time to time, as suited the exigencies of
moment. The property of a house of
e in an enemy's country is liable to con-
nation, whatever be the domicile of the
ners who constitute the house. If some of
partners have a neutral residence, their sep-
e property will not be affected by the fact
eir being connected with a house of trade
a hostile country. And when a shipment is
de by the house to a partner in a neutral
ntry, or by a partner in a hostile country to
ouse in a neutral country, it depends upon
question to whose account and risk the
ds are shipped, whether they are liable to
condemned as prize. Commercial factories
a foreign country, which are free from the
trol of the government of that country, are
sidered as belonging to the country by
ch they are established, and the nationality
persons engaged therein is determined ac-
lingly. But this exception does not apply
ere the government of the country has the
trol, although peculiar privileges are grant-
to the subjects of a particular nation. A
ign minister does not lose his domicile in
own country by residing in the foreign one
which he is accredited; but if he engages in
de there, he is, in respect to such trade, con-
red as a citizen of the country where it is
ried on. The domicile of a mariner is the
ntry of his birth; but if he engages in a ship
trade which is hostile to a particular country,
is in respect to that country considered as
enemy.—It sometimes occurs that circum-
nces will not permit property captured at sea
be sent into port. The captor in such a case
y destroy it, or allow the master or owner
ransom it. Such a contract is valid by the
v of nations, but is prohibited in England by
tute. By the ransom bill the vessel is pro-
d from subsequent capture until she reaches
own country, or the country specified in
bill, provided there be no deviation from
course of the voyage. Generally some of
officers and crew are retained as hostages,
d if they die, or the vessel is lost by a peril
the sea before her arrival in port, unless it
otherwise stipulated in the bill, the ransom
nevertheless due; for the captors do not insure either the safe arrival of the vessel or the lives of the hostages. If the vessel deviates and is afterward captured and condemned, it has been questioned whether the debtors of the ransom are discharged from their contract. According to Valin it is the constant practice in France to consider the debtors as discharged, and the price of the ransom is deducted from the proceeds of the prize and given to the first captor, and the residue given to the second. If the captor himself should after the seizure be taken by an enemy's cruiser, together with the ransom bill, the ransom becomes part of the lawful conquest of the enemy, and the debtors of the ransom are consequently discharged from the contract under the ransom bill.—The right which a captor acquires by the seizure is an inchoate right merely, and is subject to be divested before condemnation. If there is a recapture, escape, or voluntary discharge of the property, a court of prize cannot proceed to adjudication. By the Roman law of *jus postliminii*, persons or things taken by the enemy were restored to their former state upon coming again into possession of the nation to which they had belonged. Formerly, as between the belligerents, the title to property captured passed after it had been in the possession of the captors 24 hours; and if after that time it was recaptured by third persons, they became the absolute owners of it. Now, however, the property of the original owners is not divested until condemnation, and the recaptors are merely entitled to salvage, the amount of which is in the United States fixed by statute for most cases, and when not so fixed is determined by the general principles of law. Salvage has been allowed where, although the original capture was illegal, the acts of the government showed that the law of nations would have been violated and the vessel condemned if it had been taken in. There is some conflict of authority whether the crew of a vessel who recapture it before condemnation are entitled to salvage. It would seem that in the United States they are not, because it is considered to be the duty of the crew to do all that they can to save the vessel until she is condemned. If a treaty of peace makes no particular provisions relative to captured property, it remains in the same condition in which the treaty finds it. In England, as between English subjects, the right of postliminy subsists to the end of the war, and foreign nations are treated with the same liberality which they accord in similar circumstances to England. The property of a subject or an ally engaged in commerce with the enemy is liable to capture; and it makes no difference whether the trade be direct or indirect. The law of nations permits vessels to sail and chase under false colors, but not to fire a gun or capture under them.—It has become an established principle of the law of nations, that a nation which takes no part in a war shall have the same rights which it has in time of peace, except so far as the ex-

ercise of these rights would materially interfere with the permanent rights of the belligerents. Within her own territory, which for this and other purposes extends a marine league from the shore, a neutral nation is supreme. No belligerent has a right to make a capture in her waters, or to arm or equip his ships of war in her ports, and if either of these things is done the neutral is bound to redress the injury. A ship has no right to station itself in a neutral port and send out boats to make hostile seizures. It has been thought by some jurists that if a vessel is pursued and goes into a neutral port, it may be pursued *dum fervet opus*, and captured; but the better opinion is that this is a clear violation of the neutral territory. The neutral nation may allow certain privileges to one of the belligerents, but only such as she is willing to allow to the other. She cannot lend money to one belligerent, but if she is under a previous stipulation, made in time of peace, to furnish a given number of ships or troops to one of the belligerents, the contract may be complied with. But it is said that she is not bound to do this if her ally was the aggressor. If a prize is brought into a neutral port, the neutral government may exercise jurisdiction so far as to restore the property of its own subjects which has been illegally captured. And it has been held in the United States that foreign ships, which offend against the laws of that country within its jurisdiction, may be pursued and seized upon the ocean, and brought back for adjudication. In 1793 the government of the United States established rules of neutrality which it required foreign belligerent powers to observe in their intercourse with this country. Among others was one which provided that if an armed vessel of one nation should depart from our jurisdiction, no armed vessel being within the same and belonging to an adverse belligerent power should depart until 24 hours after the former. It is now a universally admitted principle of the law of nations that a belligerent has a right in time of war to visit and search all vessels on the ocean, in order to determine whether they or their cargoes are hostile or neutral. This right gives also as a necessary incident the right to seize and send in the vessel for adjudication, whenever its real character, or that of its cargo, is justly open to suspicion. The neutral must submit, and if her crew rise and endeavor to recapture the vessel, it is a hostile act, which subjects the vessel and cargo to condemnation. Neutral goods may be carried in a belligerent vessel even if the latter is armed, according to the law in the United States; and a neutral ship is not subject to seizure if she has belligerent goods on board. Attempts have been made at different times to engraft on the law of nations the principle that free ships make free goods, but the law remains unchanged, except as it has been modified by treaties between particular nations. The question whether a country, which during peace confines the trade of its colonies to its own subjects, can during war open such trade to a neutral, has been much discussed. In England it has been held that it cannot; but this rule has been repudiated by the government of the United States. Neutrals are not permitted to carry goods which are contraband of war, or to enter a blockaded port. (See BLOCKADE, and CONTRABAND.) Breach of blockade forfeits the vessel, and in some cases the cargo; but according to the modern practice, the carrying of contraband goods only forfeits the goods, and the owner of the vessel loses merely his freight and expenses, unless the same person owns both ship and cargo, or some fraud appears in the transaction, in which cases both ship and cargo are forfeited. If an enemy's cargo is captured in a neutral vessel, the vessel has a claim on the captors for freight. But this rule is limited by the reason of it, and if the cargo be contraband, or the voyage be *quasi* contraband, then the neutral vessel loses its freight. The rule that freight is not earned unless the goods are carried to their destination, applies to capture. But if the captor takes the goods where they should have been carried, and even if he does this substantially though not precisely, as by bringing goods to Boston which were destined to New York, freight is due.—All seizures at sea are made at the peril of the captors. If, on being sent in, the vessel and cargo are acquitted, the captors are responsible for all damages and costs, unless the capture was made with probable cause. What is probable cause is a question of some difficulty, and depends very much upon the facts of each particular case. In general, if the papers appeared false or colorable, or were suppressed, mutilated, or spoliated; if the voyage were to or from a blockaded port; or if other circumstances of a like nature occurred, the captors would be justified in sending the vessel in for adjudication. After the vessel is captured, the captors are responsible for any loss which may occur by the negligence, fault, or misconduct of the prize officers and crew; but they are not responsible if a loss occurs from accident, stress of weather, recapture, &c.—While a ship is forfeited by the master disguising belligerent property on board as neutral, without the authority, assent, or knowledge of the owner, this act does not operate as a breach of neutrality as to the goods on board which are actually neutral and proved to be so by proper documents, and belong to another owner than him who has forfeited the goods. If neutral interests or property are undistinguishably mixed up with belligerent interests or property, they become liable themselves to all the incidents and effects of a belligerent character. A resistance to search when rightfully demanded, an attempt at rescue, and seeking belligerent protection or receiving it, are all breaches of the duty of a neutral; but it is said in qualification of this rule, that if any of these or similar things are done because a belligerent renders them necessary by his own illegal conduct, they are justifiable. Some question has arisen as to what is a rescue. It is the duty of the captors to put on board persons competent to navigate the vessel into port for adjudication, and her own master and crew are not bound to do this. If the vessel is given up to them, and they pursue their original course against the wish of the captors, this is not a rescue. But if the neutral crew undertake and promise to navigate the vessel to the desired port for adjudication, and the vessel is given up to them for this purpose, and they violate their promise and take the vessel into their own hands for their own purposes, this is an unlawful rescue. Generally a cargo is considered as liable to condemnation, if any act has been committed by the master which subjects the ship to condemnation. But the cargo is not liable to condemnation if it is the property of a person other than the owner of the ship, and its owner was not cognizant of the intended violation. If, however, the owner of the cargo gave the master discretionary power, he is liable for his acts; or if the cargo was loaded after notification of a blockade, the parties having full knowledge of the fact. Resistance to the right of search, the rescue or recapture of the ship by the master and crew, and the fraudulent suppression or spoliation of papers, affect the owner of the cargo as well as the owner of the ship.—By a statute in the United States, it is the duty of the master to carefully preserve all the papers and writings found on board a prize, and transmit the whole of the originals unmutilated to the judge of the district to which the prize is ordered to proceed, and transmit to the navy department, and to the agent appointed to pay the prize money, complete lists of the officers and men entitled to a share of the capture, inserting therein the quality of every person rating. The prize master is also required to make an affidavit that the papers are delivered up as taken, without fraud, addition, subduction, or embezzlement. The master of the captured vessel, the principal officers, and some of the crew should be brought in, and these persons are examined on the standing interrogatories prepared by the court for that purpose. At this examination no counsel are permitted to be present. Only the papers and documents delivered up to the captors are admissible; and if the captors conceal any, they cannot afterward be put in. The case is determined on this evidence and the documents of the prize; but, if it is necessary, the court will require further proof from either party alone or from both. Oral testimony is never admitted. Although the evidence of the captors is not allowed in the first instance, yet original evidence taken on the standing interrogatories in other prize causes is admissible. In cases of joint or collusive capture, the usual simplicity of prize proceedings is necessarily departed from; and where there is the least doubt, other evidence than that arising from the captured vessel, or invoked from other prize causes, may be resorted to. The principal grounds for condemning a ship as prize, where the question of nationality is in dispute, are: 1, the entire want of the necessary papers; 2, their destruction; 3, their material alteration or falsification; 4, the time when the papers were made out, as whether before or after the war, is often material; 5, next in importance is the conduct of the master and officers; 6, their prevarication or evident falsehood in the preliminary proof; 7, their refusal or inability to give a good account of the ship and cargo; 8, the domicile of the master and officers. The spoliation of papers, by which is meant, not merely their total destruction, but such falsification as makes them useless or worse as evidence, is a circumstance of grave suspicion, but is open to explanation; and if the captured in the first instance fairly and satisfactorily explains it, he is deprived of no right to which he is otherwise entitled. Possession by an enemy is presumptive proof, though not conclusive, of hostile character. Ships are presumed to belong to the country under whose flag they sail; and it has been thought that this presumption should be conclusive as against the person using the flag. In joint captures all public ships of war in sight are presumed to assist, and therefore they are entitled to share in the proceeds; and this presumption extends to all the ships of a squadron united by authority for a specific purpose, as for a blockade for example, although not actually in sight; but it does not apply to privateers, because they are not obliged to capture all vessels they meet, as are vessels of war. Revenue cutters, as they are generally employed to protect the revenue, and have no special injunction to capture enemy's vessels, come under the same rule as privateers in this respect. Every ship is expected to have on board the necessary papers to establish her nationality; and these are the papers which the law of her own country require as evidence of that character. The same rule applies to cargoes. The burden of proof is on the claimant to prove a neutral proprietary interest. Property found on board an enemy's ship is presumed in the absence of proof to the contrary to be enemy's property; and a person claiming under a title by capture must show a valid sentence of condemnation. The sale of a ship or cargo under a decree of admiralty, founded on condemnation as prize, is valid and binding upon all courts and parties, unless it is shown to be vitiated by fraud.

PRIZE MONEY. The distribution of prize money, or of the proceeds of the sale of ships or goods adjudged by courts of admiralty to be good prize, is carefully regulated by statutes of the United States. The provisions are very minute; but substantially they are as follows. 1. When the captures are made by public armed ships, if the captured ship be of equal or greater force than the ship making the capture, the proceeds belong wholly to the captors; otherwise they are equally divided between the United States and the captors. The commanding officers of fleets, squadrons, or single ships take 3 twentieths, the whole of which goes to the commander of a single ship acting independently; but if he is under the command of an officer of a fleet or squadron, that officer has one twentieth, and the commander of the ship the other two. Sea lieutenants, captains of marines, and sailing masters take 2 twentieths; chaplains, lieutenants of marines, surgeons, pursers, boatswains, gunners, carpenters, and master's mates, 2 twentieths; midshipmen, surgeon's mates, captain's clerks, schoolmasters, boatswain's mates, gunner's mates, carpenter's mates, ship's stewards, sailmakers, masters at arms, armorers, cockswains, and coopers, 3½ twentieths; gunner's yeomen, boatswain's yeomen, quartermasters, quarter gunners, sailmaker's mates, sergeants and corporals of marines, drummers, fifers, and extra petty officers, 2½ twentieths; seamen, ordinary seamen, marines, and all other persons doing duty on board, 7 twentieths. One or more public ships in sight of a capture share equally in the prize or prizes. A bounty is paid by the United States of $20 for each person on board of any ship of the enemy at the beginning of an engagement, which is sunk or destroyed by a public armed vessel of equal or inferior force; and this bounty is divided as prize money. 2. If the ships or goods are captured by private armed ships commissioned by government, the prize property, within 60 days after condemnation, shall be sold by the marshal of the district in the manner and on the terms designated by the owners of the privateer, and the proceeds divided between the owners, the officers, and crew, according to their articles of agreement; and if there are no articles of agreement, one half goes to the owners, and one half to the officers and crew. Usually, if not always, the shipping articles of a privateer or letter of marque determine the proportions in which the proceeds are to be divided.

PROBATE, in law, the proof, before the competent authority, that an instrument offered, purporting to be the last will and testament of a person deceased, is indeed his lawful act. Until the act 20 and 21 Victoria, c. 77 (1857), amended the law relating to probates and letters of administration in England, the custody of the estates of all deceased persons vested there primarily in the ordinaries or bishops of dioceses, subject only to the exceptional rights of the crown or of lords in respect to certain manors. The new act of 1857 abolished the ancient ecclesiastical jurisdiction, and conferred full and exclusive authority over all testamentary causes upon the queen, to be exercised in her name in a court to be called the court of probate. Ecclesiastical courts never existed indeed in the United States; but from the very settlement of the country the office and functions of the English ordinaries have been exercised here by similar officers under various titles, and generally with larger powers than those functionaries possessed. In New York probate is granted by the surrogate; in South Carolina by the ordinary; in Pennsylvania by the register of wills, who is also a judge, and his probate a judicial act. In some states the county courts, and in others the orphans' courts, grant letters of probate; and in most probate is granted by a judge of probate. These several judicatures concern themselves only with the *factum* of a will. They declare whether or not a valid will exists, and no executor, or administrator with the will annexed, can assert his rights in any court without showing his letters testamentary; that is to say, the legal evidence that the will under which he claims to act has been approved and established in the court of probate. The construction of the will, or the operation and effect of its particular provisions, rests with the courts of law; and where the original court of probate takes any jurisdiction of these questions, an appeal lies from it to the higher courts of law or equity. In England the rule has been that probate was necessary of such instruments only as were testamentary and regarded personal property. If they affected lands alone they needed not to be proved in the spiritual courts. In this country the rule is different. In many of the states, certainly in Massachusetts, Vermont, New Hampshire, Maryland, Michigan, and Ohio, it is expressly provided by statute that no will shall be effectual to pass either real or personal estate unless it shall have been duly proved and allowed in the probate court. So in New York, all wills in which an executor is named, whether they relate to real or personal property, must be formally proved. And generally, whenever power is conferred in general terms on probate courts to take probate of wills, it is presumed in this country that their jurisdiction includes wills as well of realty as of personalty; and their decrees in both these respects are regarded as conclusive. So long then as the probate remains unreversed on appeal, the due execution of the will, the sanity or capacity of the testator, and the attestation of the witnesses, cannot be called in question in the courts of common law. The same rule is in some states observed in respect to wills once admitted to probate, though they were made and executed in other states according to forms not sufficient where they were approved. In some states the probate of wills of lands is *prima facie* evidence, but not conclusive, of the due execution of these instruments; in others the probate becomes conclusive in these respects after the lapse of a certain number of years—2 in Ohio, 5 in Mississippi, and 7 in Virginia. In New York it has been held that the sentence of the surrogate, affirming a testator's competency to make a will of personal property, is not conclusive as to a devise of real estate contained in the same will upon the parties to a subsequent suit. It is matter of common law that the competent authority may, either *ex officio* or at the instance of a party in interest, order the executor, or any other who has the custody of an alleged will, to exhibit it for probate. This power is incident to the general jurisdiction of probate and of granting administration. In this country statutes in many states define this authority more precisely, and prescribe the method of exercising it. Refusal to comply with the order of the court in such a case is punishable by imprisonment. In New York the production of the will is commanded by subpœna. Sometimes the executor is required to offer the will for probate within a certain period after the testator's death, and his default is punished with a penalty. In Massachusetts any one may insist on the proof of a will who has a right to offer it in evidence or to make title under it; and it has been held accordingly that the creditor of a devisee has this right for the purpose of procuring satisfaction of his debt.—In most of the states the procedure of the court upon probate is fixed by the legislature, and the common law distinction between probate in common form and in solemn form has in great measure disappeared. In North Carolina, Georgia, Tennessee, and probably elsewhere, the distinction however is still observed. A will is said to be proved in common form, when the executor presents it to the court, and, without summoning any of the parties interested, calls one or more witnesses to prove its execution. The objection to this mode of proof was, at common law, that at any time within 30 years the executor might be called upon by any party in interest to make proof in solemn form. This mode is not in common use in the United States, and even when it is used the time within which probate may be contested is much reduced by statute. Thus, in New Hampshire the revision must be made within a year; in Mississippi the validity of the will may be disputed within 5 years; in Virginia 7 years is allowed for the same purpose. Proof is made in solemn form, or by form of law or *per testes*, when all persons whose interests are to be affected by the will have been duly notified to be present, and have had opportunity to be heard in the premises. This is now the usual mode of proof in the United States, and after the will is approved in this way it is for ever binding. The method of proof, however, like many other points of probate practice, is often regulated by particular statute provisions. The testimony which the judge calls for at the hearing relates to the *factum* of the will, as the phrase is. The question being whether the instrument is a will or not, it is of the first importance to inquire into the capacity of the testator, and whether he did in fact execute the alleged will as it purports to have been executed. It is to furnish evidence on both these points that disinterested persons are invited to witness the execution of a will. These attesting witnesses are then most essential parties in a question of probate. Generally all of them must be summoned if they are living within the process of the court; but if from death, or absence from the country, or from incompetency arising since the attestation, any witness cannot be produced, the will may be proved by the others and by proof of the handwriting of the party who fails. If all are dead, or out of the court's jurisdiction, the handwriting of all must be proved; and probably in such a case the handwriting of the testator also. The attestation clause is generally framed with a regard to the requirements which the statutes of the state where it is made render essential to the valid execution of a will. If the evidence of the witnesses shows plainly that these requirements were not followed, the presumption of a valid execution furnished by the recital of them is overset; but if the subscribing witnesses have lost all recollection of the particulars of the transaction, the formal execution will generally be presumed and the will admitted to probate. Failure of memory on the part of one of the witnesses may often be supplied by the evidence of another or of the rest of them. In affixing his name, an attesting witness is regarded as certifying the capacity of the testator. His subsequent attempt to impeach the instrument by declaring that the testator did not execute the will with an intelligent and disposing mind is justly open to suspicion. Evidence of this character is not to be entirely rejected, though it avails little without the support of other testimony. When 30 years have passed since the death of the testator, a will is said to prove itself; the subscribing witnesses being presumed dead, the bare production of the instrument suffices. The will must however have come from a custody which forbids question of its genuineness, and be in other respects free from suspicion, or the genuineness must in some way be proved. Though it is a general rule, which applies as well to wills as other writings, that evidence *ab extra* is inadmissible to control them, yet when any such ambiguity is patent upon the face of the instrument as tends to call in question the *factum* of the will, there must be of necessity a resort to extrinsic evidence. Examples of such ambiguity are those cases where it is doubtful whether the writing was subscribed merely by way of authenticating what in fact were memoranda of a will to be made, or whether it was intended by the testator as indeed a final will; whether he intended to embody a particular clause in his will, or whether it was introduced without his knowledge; whether the residuary clause was or was not intentionally omitted; and the like matters, which go to the fact, not to the effect of the instrument. If the testator were blind or illiterate, the court will require proof that the will was *properly* read to him, and that he executed it intelligently. Interest under a will, however slight, incapacitates one from giving evidence in support of it, where the old rule of the common law remains in force; but this incapacity may be removed by the witness renouncing or releasing his interest.—Wills alleged to have been lost, destroyed, or mislaid, may be admitted to probate on proof of these facts, and on clear and satisfactory evidence of their contents. No parol evidence of the contents of a will alleged to be lost will be received, until it appears conclusively that diligent search has been made for the necessary document in those places where it would most naturally be found.

PROBUS, Marcus Aurelius, a Roman emperor, born in Sirmium, Pannonia, about A. D. 232, assassinated there in 282. While still very young he gained the favor of the emperor Valerian, who raised him to the rank of tribune long before the regular age. He commanded successively the 3d and 10th legions, and served in turn in Africa and Pontus, on the Rhine, the Danube, the Euphrates, and the Nile. Under Aurelian he reconquered Egypt, which had fallen into the hands of Zenobia; and by the emperor Tacitus he was made commander-in-chief of the eastern provinces with 5 times the usual salary, the promise of the consulship, and the hope of a triumph. Upon the death of the emperor in 276 the armies of the East forced him to assume the imperial purple, and the downfall of his rival Florianus soon left him at the head of the Roman world. He first turned his attention to Gaul, where he recovered 70 flourishing towns from the Germans, destroyed 400,000 of the invaders, and drove the remainder across the Rhine. He penetrated into Germany, exacted from the inhabitants a heavy tribute of grain, cattle, and horses, and a restitution of the property carried away from the Roman provinces, and obliged them to supply the Roman army with 16,000 recruits. He also built a stone wall stretching from the neighborhood of Neustadt and Ratisbon on the Danube as far as Wimpfen on the Neckar, and thence to the Rhine, a distance of nearly 200 m. He secured the frontier of Rhætia, crushed the power of the Sarmatians, admitted the Goths to an alliance, and took several castles from the Isaurians. The rebellion of Saturninus, the commander of the eastern army, and the revolt of Bonosus and Proculus in the West, were speedily suppressed. Peace now prevailed throughout the empire, and Probus returned to Rome and celebrated a triumph. In order to maintain the discipline of his troops, he constantly employed them in active labor, and the hills of Gaul and Pannonia by their toil were enriched with vineyards. Finally an unguarded remark, that by the establishment of universal peace he should render a standing army unnecessary, proved fatal to him. While his soldiers were draining the marshes of Sirmium a mutiny broke out, and Probus fled to a high tower; but the troops forced his retreat, and put him to death. He is regarded as one of the best as well as ablest of the Roman emperors. He was succeeded by Carus.

PROCESS, in law, a term which, in a large sense, signifies the whole proceedings in any action, civil or criminal, real or personal, from the beginning to the end. In a narrower and more technical sense, the term is applied to different stages of the procedure; as is seen in the terms original process, which includes those precepts or writs by which one is called into court; final process, or the forms of procedure by which judgment is carried into execution; and mesne process, which covers the proceedings between the other two, and embraces all proceedings properly so called, as writs for compelling the attendance of jurors or witnesses, and for other collateral purposes. Mesne and final process are sometimes collectively described by the term judicial process, because proceedings in these stages of an action were authorized immediately by the court and issued under the hands and seals of the presiding judges. Original process, on the other hand, was so called because it was founded on the original writ, which, issuing out of chancery and bearing the *teste* of the sovereign, conferred jurisdiction on the court to which it was addressed, and founded its authority over the matter in controversy. In the strict technical sense, process is the means employed for bringing the defendant into court to answer to the action. The first step therefore in the ancient procedure was to give the defendant notice of the issue and pendency of the original writ. This notice was given ordinarily by summons, which was a warning to the party to appear at the return of the writ, and was served upon him by the sheriff or some of his messengers. If the defendant disregarded this monition, the next step was a writ of attachment, bidding the sheriff to take certain of his goods to be forfeited if he failed to appear, or to take the pledges of certain sureties of the defendant, who should be amerced in case of his non-appearance. If the sheriff made return that the defendant had no goods whereby he could be attached, or if after attachment he failed to appear, the court issued a writ of *capias* commanding the sheriff to take the defendant's body. This writ and all others subsequent to it were called judicial, because, as we have already seen, they proceeded immediately from the court, and not from chancery. The proceedings before *capias* became in time merely formal, and it was usual to sue this out in the first instance upon a supposed return of the sheriff.—The old system of process had become very abstruse, complicated, and inconvenient. Its evils were first brought formally to the public attention in England by the common law commissioners in 1828. The uniformity of process act, which followed soon after, abolished all other modes of original process, and supplied their place with five new rits. This statute was confined to personal tions. Real actions were provided for by atute 3 and 4 William IV., which destroyed l the old real writs but three, namely, dower, are *impedit*, and ejectment. Process was ill further simplified by subsequent acts, and as brought to its present position by the common law procedure act of 1852. All personal tions in the superior courts of law must now commenced in England by writ of summons. n some cases, indeed, arrest is still possible, d then *capias* may issue; but this writ can t now begin the action, as it might formerly ave done.—In some of the United States legis tion has been addressed lately to the simplifi ation of the forms of procedure. The New ork code abolished all the old forms of ac ons, took away all distinction between legal d equitable remedies, and established a uni rm course of proceeding in all cases and suits. ll civil actions in courts of record (and by a vil action the code means every action that not a criminal prosecution) are commenced y a service of summons, which requires the efendant to answer the complaint preferred gainst him by the plaintiff. In Massachusetts d other states process has been reformed by provements of a similar character, varying owever in their details.—In the criminal law ocess applies in an extensive sense to all ose instruments which are issued by compe nt authority for the purpose of bringing a rty into court, or of executing the judgment f the law upon him. The term thus includes mmonses, warrants, capiases, attachments, ittimuses, subpœnas, and all other writs which re employed in criminal cases. The state con itutions provide that all criminal process shall e in the name of the sovereign power, and is is expressed in different cases by the terms e state, the people, or the commonwealth.

PROCLUS, a Greek philosopher of the Neo-Platonic school, born in Constantinople, Feb. 8, A. D. 412, died in Athens, April 17, 485. The earlier years of his life were spent at Xanthus in Lycia, whence he went to Alexandria for the purpose of continuing his education, remained there several years studying under the most eminent teachers; and before he was 25 years old removed to Athens. At the age f 28 he had written several treatises, one of which was his commentary on the "Timæus" of Plato. Upon the death of Syrianus he succeeded that philosopher in the school at Athens, and from this circumstance he is sometimes called Diadochus (*i. e.*, the successor). Once he was obliged to leave that city, perhaps on ccount of having violated the laws of the Christian emperors; but after spending a year n the East he returned, and passed the remainder of his life at Athens. He adopted the scetic system which became common in the ater Neo-Platonic school, abstained almost en rely from the use of animal food, refused to arry, and observed numerous fasts and vigils. He worshipped the sun and moon, the spirits of heroes and philosophers, and even the spirits of the whole human race, and celebrated all important religious festivals, no matter of what nation. "His life," says Gibbon, "with that of his scholar Isidore, composed by two of their most learned disciples, exhibits a deplorable picture of the second childhood of human reason." In addition to his various religious exercises, he delivered 5 lectures a day. His extant works consist chiefly of commentaries, principally upon Plato. One of his original works is entitled "Twenty-two Arguments against the Christians," in which he endeavored to maintain the eternity of the universe. As a writer he is usually regarded as one of the clearest of his school, but as a philosopher his reputation has never stood high. Cousin, however, considers that all the philosophic rays which ever emanated from the great thinkers of Greece, Orpheus, Pythagoras, Plato, Aristotle, Zeno, Plotinus, and others, were concentrated in and remitted by Proclus. He was also distinguished as a mathematician and grammarian. There is no complete edition of his extant productions, but an edition by Cousin (6 vols. 8vo., Paris, 1820-'27) is most nearly so. Translations of several of his works have been made into English by Thomas Taylor.

PROCONSUL, a Roman magistrate who acted for the consul, with consular power, generally in the government of a province. He was almost always one who had previously been consul. The first proconsul was Q. Publilius Philo, who in 327 B. C. was at the head of the army in the second Samnite war when his consular year closed, and was then continued in the function beyond his time because his recall would have destroyed the advantages already gained. The proconsular dignity was always afterward conferred in similar cases.

PROCOPIUS, a Byzantine historian, born in Cæsarea, Palestine, about the beginning of the 6th century, died about A. D. 565. Removing to Constantinople when still young, he obtained there so much reputation as an advocate and professor of eloquence, that in 527 he was chosen secretary by Belisarius, and accompanied that commander in his wars against the Persians, against the Vandals in Africa, and against the Goths in Italy. During the last mentioned war he had charge of the commissariat department, and was at the head of the fleet. Returning with Belisarius to Constantinople about 542, he received from the emperor Justinian the title of *illustris* and the position of senator, and in 562 was made prefect of the city. The most important work of Procopius is his elegant and interesting "History" of his own times in 8 books, beginning with the war against the Persians, relating the wars against the Vandals and Goths and the history of the Gothic kingdom in Italy, and ending at the commencement of the year 553. The work has been translated into English by Sir Henry Holcroft (fol., London, 1653). Another work, entitled *Anecdota*, consists of a collection of anecdotes portraying the morals of the Byzantine court, and reflecting severely upon the prominent men of the time. The authorship of this has been questioned, but there is little doubt that it was written by Procopius. An English translation of it was published anonymously under the title of "The Secret History of the Court of the Emperor Justinian" (London, 1674). The best edition of Procopius's collected works is by Dindorf (3 vols., Bonn, 1833–'8).

PROCRUSTES (Gr., the stretcher), the surname of Polypemon or Damastes, a legendary robber of Attica, who had an iron bed upon which he placed all the travellers who fell into his hands; if they were longer than the bed, he cut enough from their limbs to make them fit; if they were shorter, he stretched them. He was slain by Theseus on Mt. Cephissus.

PROCTER, Bryan Waller, an English poet, better known by his anagrammatic pseudonyme of Barry Cornwall, born in London about 1790. He was educated at Harrow, where Byron was his schoolfellow, and, after passing some time in the office of a solicitor in Wiltshire, removed to London, and in 1831 was called to the bar from Gray's Inn. He has since that time steadily practised his profession, and for a number of years has held the office of commissioner of lunacy. His literary career commenced in 1819 with the publication of a volume entitled "Dramatic Scenes and other Poems," written, he said, "to try the effect of a more natural style than that which had for a long time prevailed in our dramatic literature." His remaining works are: "Marcian Colonna, an Italian Tale; with three Dramatic Scenes, and other Poems" (1820); "A Sicilian Story, with Diego de Mantilla and other Poems" (1820); "Mirandola, a Tragedy" (1821); "The Flood of Thessaly and other Poems;" "Poetical Works" (3 vols., 1822); "Effigies Poeticæ" (1824); "English Songs and other Small Poems" (1832); and "Essays and Tales in Prose" (1851). He is also the author of a life of Edmund Kean, and of a memoir of Shakespeare and an essay on his genius. His "Mirandola" was produced with considerable success at Covent Garden, and by many his dramatic pieces, founded on the style of the Elizabethan writers, are considered his highest efforts. He is however better known by his songs, some of which are singularly well adapted to music, and are equally refined in sentiment and diction. All his publications have appeared under his assumed name of Barry Cornwall.—Adelaide Anne, daughter of the preceding, has published "Legends and Lyrics, a Book of Verse" (1858; 5th ed., 1860), and "A Second Volume of Legends and Lyrics" (1861), containing poetry which, "without imitation, has much of the paternal grace and manner."

PROCTOR (Lat. *procurator*, agent), in a general sense, one who is commissioned to manage the business of another. In a particular sense, a proctor is one who is commissioned to transact the business of his principal in the ecclesiastical or admiralty courts. He discharges functions similar to those of attorneys and solicitors in other courts. In England, the proctor can be admitted to practice only after a clerkship of 7 years with a senior proctor of at least 5 years' standing, and he must produce a certificate of considerable proficiency in classical education. Before the abolition of the probate and matrimonial courts of doctors' commons, the proctors were the only persons allowed to practise in them. (See Doctors' Commons.) According to the original and stricter practice, the proctor's authority to act for his principal must be conferred by a proxy, that is, by an instrument signed by the principal, attested by witnesses, and deposited in the registry of the court. Proxies are still requisite in the ecclesiastical courts; in admiralty they were long ago dispensed with, and a verbal appointment is now sufficient. If the proctor has been regularly admitted to practice, he, like an attorney at law, is presumed in all cases to have authority to appear until his right is disputed. Yet, though the court will presume either his due authority, or at least that he has good reason to believe that those whom he represents have an interest in the cause in issue, it may at any time demand the names of the parties for whom the proctor appears.—Proctors are known in the United States only as officers of the courts of admiralty. In some portions of the country they attend to the whole management of the case from the beginning; in others they conduct the case out of court, while the examination of witnesses in court, the motions, arguments, and other incidents of the trial, are attended to by an advocate. When once retained, the proctor has the whole direction of the cause; but his power may be revoked by the suitor at any time, without cause assigned. This is properly done, under leave of the court, after notice to the proctor, because a proctor is an officer of the court. As he is invested with large discretionary power and influence, the proctor is held to the utmost good faith and integrity. Unless a case is in his opinion just, or at least doubtful, he ought not to bring it before the court. This principle is especially applicable in the case of suits by seamen, where generally no available responsibility is incurred by the libellants. Indeed, for any merely experimental or wanton litigation, or for any want of good faith toward the court, or of fair dealing toward the opposite party, the proctor may be punished by the court. For "sharp and hungry practice" Sir William Scott condemned a proctor to pay the costs of his client's suit; and he added that he was perhaps dealing too temperately in not going further. The duty of the courts of the United States to repress abuses of this nature is enjoined by a special statutory provision, the act of 1813 enacting that if any proctor or attorney shall appear to have [illegible] trolled the proceedings in a case so as to increase the costs unreasonably and vexatiously, the court may order him to pay the excess of tial expense. After a suit is commenced, the respondent has not as a general rule the right to settle the case without the knowledge of the proctor of the libellant; and if he does so, the settlement may be inquired into by the court. The proctor may generally be considered so far *dominus litis*, that he is authorized to make an affidavit of any fact upon which to offer a motion, especially if the fact be peculiarly within his own knowledge. But he cannot release or compromise a claim without special authority. He may however receive payment and the amount so paid is a discharge *pro tanto*. After a decree, unless by special authority of the court, the proctor has no power except to sue out and enforce execution.—The name proctor is also given in England, and in some American colleges, to university officers whose business it is to guard the morals and order of the university.

PRODICUS, a Grecian sophist, a native of Iulis in the island of Ceos, who flourished in the latter part of the 5th century B. C. Plato represents his instruction as chiefly ethical. He regarded the gods as only the personification of whatever contributes to the comfort of human life, and it is stated by Suidas that he was condemned to drink hemlock as a corrupter of the youth of Athens; but this is doubted.

PROGRESSIVE FRIENDS, the name first adopted by a religious society formed by a convention held in Salem, Columbiana co., Ohio, in Sept. 1852, and composed chiefly, though not exclusively, of persons previously identified with the Hicksite branch of the society of Friends. Previous to this time, the Indiana, Ohio, and Genesee yearly meetings of Hicksite Friends had been divided upon questions connected with slavery, and the minorities, which had either seceded or been cut off, had formed new associations, one at Green Plain, Ohio, and another at Waterloo, N. Y., adopting the name of Congregational Friends. The formation of the society of Progressive Friends at Salem, Ohio, was a more complete development of the principles which found expression in the earlier associations, and its name is now widely accepted as the appropriate designation of all those who avow their sympathy with these principles. In 1853 a large society or yearly meeting of Progressive Friends was formed in Chester co., Penn. The society at Waterloo, N. Y., adopted the name, and similar associations were soon afterward formed in various places, some of them taking the name of Friends of Human Progress, instead of Progressive Friends. There are now 5 or 6 yearly meetings and many smaller associations, bearing one or the other of these names, in different parts of the country. These societies have no creed, written or unwritten, as a basis of fellowship. They invite to membership and coöperation all who recognize the equal brotherhood of the human family, and acknowledge the duty of defining and illustrating their faith in God, not by assent to any form of theological opinion or doctrine, but by lives of personal purity and works of beneficence. They hold that churches are not divine but human organizations, possessing no higher powers than those which they derive from the persons of whom they are composed. They have no ordained ministers or elders, and no prescribed ceremonies or forms of worship, but aim to preserve the liberty of speech and of conscience to the fullest extent.

PROJECTILES. See Gunnery, vol. viii. p. 577, and Mechanics, vol. xi. p. 322.

PROMETHEUS, in Grecian mythology, the son of the Titan Iapetus by Clymene, and brother of Atlas, Menœtius, and Epimetheus. According to Hesiod, the gods and men were in a dispute at Mecone in regard to duties and privileges, and especially as to what portion of the animal should be offered to the former in sacrifice. Hereupon Prometheus divided a bull into two parts, wrapping up the flesh and intestines in the skin for one, and the bones covered with the fat for the other. Jupiter, having then been asked which of the two he would choose, decided for the latter, and the choice made could not be revoked. Indignant at the deceit practised upon him, he withheld fire from mortals; but Prometheus stole fire from heaven in the hollow of a tube. Jupiter now sent Pandora to earth with her box of evils, and fastened Prometheus to a pillar, where he remained for many generations, an eagle every day feeding upon his liver, which every night grew again. At length Hercules was permitted to kill the eagle and to free the prisoner. In Æschylus, Prometheus appears not only as the protector of the human race against the superior might of the gods, but as its teacher and benefactor. Through his assistance, Jupiter overcomes the Titans; but when he frustrates the design of destroying mankind, he is chained to a rock in Scythia. There he is visited by the Oceanids and by Io, to whom he foretells his long wanderings. But he is in possession of knowledge which it is essential to the safety of Jupiter to gain; and aware that his help is yet to be invoked, he bids defiance to his persecutor, and refuses to make known the fact. He is hurled hereupon into Tartarus, and afterward reappears chained to Mount Caucasus, and undergoes fresh torments. From this condition he can only be freed when some other god shall voluntarily descend into Tartarus for him, which was finally the case when Chiron, wounded by Hercules, sought permission to go into Hades. Still another account says that Jupiter himself delivered Prometheus when the latter agreed to reveal the prophecy, according to which, if he were married to Thetis, she would give birth to a son stronger than himself. The most celebrated drama founded upon this myth is the trilogy of Æschylus, of which the *Prometheus Vinctus* and a few fragments of the *Prometheus Solutus* are still extant.

PROMISSORY NOTE, a promise in writing to pay money. When the promise is to pay it to the payee or his order, the note is negotiable, and, as an exceedingly useful and important instrument of business, it is governed by a system of law which is quite peculiar. (See INDORSEMENT, and NEGOTIABLE PAPER.) When not payable to order, or not negotiable, the rules of law applicable to it vary very little from those which are in force generally in relation to written contracts.

PRONOUN. See LANGUAGE, vol. x. p. 295.

PRONY, GASPARD CLAIR FRANÇOIS MARIE RICHE DE, baron, a French engineer, born at Chamelet, near Lyons, in 1755, died July 29, 1839. He was educated at the school of *ponts et chaussées*, went on several scientific missions, became assistant to the civil engineer Perronet, and aided him in building the bridge of Concord at Paris. On the completion of this work (1791), he was promoted to the rank of chief engineer. In the same year he was appointed head of the board of survey (*cadastre*). He superintended the forming of new trigonometrical tables, which he collected in 17 large volumes, now in the library of the observatory at Paris. He meanwhile filled the chair of mechanics at the polytechnic school, and in 1798 was intrusted with the direction of the school of *ponts et chaussées*, which he held until his death. Bonaparte charged him with several important missions to Italy, where, beside improvements in the ports of Genoa, Ancona, and Venice, he undertook works for draining the Pontine marshes and regulating the course of the Po. In 1827 he improved the navigation of the Rhone so as to partially prevent its overflowing. He published many works on mathematics and engineering.

PROPAGANDA, or properly CONGREGATIO DE PROPAGANDA FIDE (congregation for propagating the faith), a board of 25 cardinals founded at Rome in 1622 by Gregory XV. for the support and direction of foreign missions. It has a secretary, who is generally a bishop or archbishop, and a number of priests, advisers, and under secretaries, who hold a consultation weekly. The cardinal prefect of the propaganda is the pope's representative in all matters concerning the affairs of foreign missions, including the final appointment of all bishops in missionary countries. Pope Urban VIII. in 1627 added to the congregation a college for the education of missionary priests, where young men from every country in the world, with the exception of strictly Catholic countries, are educated, and ordained for the missionary work among their fellow countrymen. A celebrated polyglot printing establishment is attached to the propaganda, and beside a full corps of professors, including teachers of many ancient and modern languages, it possesses also a museum of antiquities and curiosities, a handsome church, and a large and select library.

PROPAGATION OF THE FAITH, S FOR THE (*la société pour la propagati foi*), a Roman Catholic missionary s founded at Lyons in 1829. Its plan raise, through a number of committees sub-committees, one cent a week from subscriber, the money being forwarded the central committee at Lyons, by wh funds are apportioned to bishops of the v missionary countries throughout the w The society spread rapidly from Lyons the whole of Europe, and has now p members in almost every country in the w It is sometimes confused with the Roman p aganda, with which however it has n in common except a similar object. Th tral committee at Lyons publishes 6 tim year a serial called the *Annales de la p tion de la foi*, the numbers of which are ily translated into all the European lan and published and distributed among the scribers to inform them of the use made o funds and of the progress of the missi work in different parts of the world.

PROPERTIUS, SEXTUS AURELIUS, a R elegiac poet, born in Umbria about the m of the 1st century B. C. He was rich un agrarian division, in 36 B. C., reduced his tune. He wrote 4 books of elegies, princ addressed to his mistress. He was a great tator of the Greek elegiac poets, chiefly C machus and Philetas. The text of Prop has come down to us in an exceedingly c state. The *editio princeps* was printed in in 1473; one of the best later editions is of Hertzberg (2 vols. 8vo., Halle, 1843–5

PROPHECY (Gr. προφητεια, from π to predict), the prediction of future ev The belief that certain men or classes of m had the faculty of predicting future events be traced in the history of many nations to the remotest antiquity; and it was in part the priesthood who were regarded as endowed with such a faculty. It is, h ever, not common to apply the term proph sying indiscriminately to all instances of alleged faculty of predicting, but it is gener ally restricted to the Old Testament the The name prophet in the languages of Christian nations is derived from the Gre προφητης, by which the Septuagint renders the Hebrew *nabi*. But it is now general agreed among the leading Hebrew scholars that the term of the Septuagint does fully correspond to the primary meaning the Hebrew word, which denotes "inspired A Hebrew "prophet," in the wider sense of the word, was therefore a man who sp by divine inspiration. Sometimes the O Testament uses the word in a bad sense men who only claim to be prophets without being so in reality, and of such as were p sessed of an evil spirit.—The principal func tion of the prophets of the Old Testament was obviously to be the privileged organs thro which God designed to keep up the intercourse of revelation between himself and his people. The prophet is the mouth through which God speaks to the people, and publicly announces, so far as necessary, the secrets into which he has been initiated. (Amos iii. 7.) The prophets therefore frequently call their prophecies words of Jehovah. As they were sent to keep the theocratic people on the right path, and to lead it forward toward the fulfilment of its destinies, their ideas were naturally turned toward the future, and, in accordance with the good or bad conduct of the people, they promised to it reward or punishment, salvation or ruin. Frequently, though for the most part obscurely, they pointed to a glorious completion of the theocracy through a great descendant of David, the Messiah. They also acted as the divinely appointed interpreters of the law given through Moses, and were especially zealous as guardians of the rights of the poor. Their mission, as a body of extraordinary teachers, became especially important in times when the ordinary guardians of the law, the priests, sided with the apostates and idolaters. Their individual labors, which frequently embraced all internal and external affairs of the Hebrew state, were however greatly shaped by particular circumstances, and but few of them were in a condition to labor so efficiently for the prosperity of their people as Isaiah. (See *Hebrews*.)—The peculiar form of their prophetic gift is not sufficiently defined in the Old Testament to leave no room for permanent speculation and controversy. The mode in which the prophet obtained his inspiration was obviously different from that in which inspirations were conveyed to Moses and the apostles. It is intimated as characteristic of a prophet that he obtained divine inspiration in visions and dreams; the name seer, which is usually given to him, points to the same source, and the language of the prophecies, which is highly poetical, well accords with it. Everywhere a sort of ecstatic transport, in which ideas were immediately received from heaven, seems to have been essentially connected with the prophetic state. This forcible working upon the mind of the prophet by the spirit of God is sometimes represented as the stronger, the less godly the life of the prophet was, as in the case of Balaam, and of Saul, who when the spirit of God came upon him threw himself upon the ground, tearing his clothes from his body. On the basis of these statements of the Scriptures, a host of exegetical writers have discussed with great keenness and learning the precise nature of the agency or agencies by which the prophetic ecstasy and inspiration were produced. Many writers, especially since the middle of the last century, have endeavored to show that the Scriptures do not assert a direct and miraculous supernatural interference, and that all can be explained by a high degree of religious enthusiasm and ecstasy. Among these writers are Eichhorn, Knobel (*Der Prophetismus der Hebräer*), Ewald (in an introductory treatise in his work on the prophets), and Dr. Williams (in the Oxford "Essays and Reviews"). With regard to the predictions of future events occurring in the books of the prophets, this class of writers either ascribe them (as Bunsen did) to a kind of spiritual clairvoyance, or they maintain (with Dr. Williams) that very few passages can be claimed as strictly prophetic; that these few cases "tend to melt, if they are not already melted, in the crucible of free inquiry;" and that what is left is certain "deep truths and great ideas." This view of the case is rejected as more or less rationalistic by the great majority of Christian theologians, who maintain that it is opposed by the plain intent of the Old Testament, by the counter testimony of Christ and the apostles in the New, and also by the concessions of unbelieving interpreters, such as Strauss, who say that the scriptural writers undoubtedly claim prophetic inspiration, but that the claim is absurd. Among the ablest works written from this standpoint must be mentioned Professor Fairbairn's treatise on "Prophecy, its Nature and Functions" (Edinburgh, 1856), Delitzsch's *Prophetische Theologie*, and especially Tholuck, *Die Propheten und ihre Weissagungen* (Gotha, 1860), who has reviewed the whole subject in a philosophical manner, and gives as the result of his studies that the prophecies cannot be interpreted "as the utterance of subjective religious aspirations," and that "the very course of history has impressed upon these declarations the stamp and confirmation of an objective and supernatural inspiration." The reader may also consult various commentaries on the books of the prophets, and that class of works which limit themselves to an interpretation of the "Messianic prophecies" throughout the entire Old Testament, among which Hengstenberg's "Christology of the Old Testament" is the best known. Some interpreters have asserted that all or certain prophecies were conditional, and therefore revocable; while the more common opinion is that when the prophet denounces the divine judgments, he proceeds on the assumption that the people will not repent, an assumption which he knows from God to be true.—The proper origin of the prophetic office must be fixed in the Mosaic economy; for although previously Abraham and the body of patriarchs in general are called prophets, because divine communications were made to them in the manner above described, yet they were not clothed with a prophetic office, which from the time of the establishment of the Mosaic law was regularly connected with the prophetic gift, so as to form part of the idea of a prophet. The book of Daniel, though he was eminently endowed with prophetic gifts, was not placed in the collection of prophetic books, because he had not filled the prophetic office. In the age of the judges, prophecy, though existing only in scattered instances, exerted a powerful influence. A more conspicuous prophetic agency begins with Samuel, who seems to have been the founder of the schools of the prophets; for they are mentioned for the first time in his history. Gibea, Rama, Bethel, Jericho, and Gilgal are enumerated as places where such schools existed. They were institutions for training prophets; the senior members instructed a number of pupils, and directed them. Samuel, Elijah, and Elisha are mentioned as principals of such institutions. The pupils are frequently called the "sons of the prophets." The prophets were mostly taken from these schools, yet not always; for Amos relates of himself that he had been trained in no school, but was a herdsman, when the Lord took him to prophesy unto the people of Israel. Sometimes, but rarely, it occurs that women came forward as prophetesses. The golden era of the prophets extends from the time of Samuel to the Babylonian captivity, and hardly any important event happened in which they did not appear as performing the leading part. About 100 years after the return from the Babylonian captivity, the prophetic profession ceased, and Haggai, Zachariah, and Malachi are uniformly mentioned by Jewish tradition as the last of the prophets.—The manner of life of the prophets was conspicuous for strictness, austerity, and asceticism. They shunned the company of the cheerful, and frequently were in poverty and want. As no provision had been made for their support by law, they had to gain their livelihood by other occupations. Some of them appear to have been in possession of considerable physical and medical knowledge, and to have occasionally made use of it. Later they often wrote down their prophecies, and many others compiled historical works. Thus Samuel, Gad, and Nathan wrote the history of David; Nathan also the history of Solomon; Shemaiah and Iddo the history of Rehoboam; Jehu the history of Jehoshaphat; and Isaiah the history of Uzziah and Hezekiah. When the prophetic office ceased, the Jews, according to the Talmud, found some substitute for it in the Bath-Kol. (See Bath-Kol.)—The New Testament mentions the power of prophecy as one of the gifts of the Holy Spirit. We read of one prophet, Agabus, who predicted the famine under Claudius and the imprisonment of the apostle Paul; but generally a foreknowledge and foretelling of futurity is not mentioned as characteristic of those men who, as Barnabas, Judas, and Silas, are called prophets in the Pauline epistles. The object of the Christian "prophecy" was, according to 1 Cor. xiv. 3, "edification and exhortation and comfort." Among the books of the canon of the New Testament only one, the Revelation, bears a prophetic character.

PROPHETS, Books of the, a part of the Old Testament. The rabbis divided the books of the Hebrew canon into three classes: 1, *Torah* (law); 2, *Nebiim* (prophets); 3, *Kettubim* (writings, hagiographa). The second class was subdivided by them into "former" and "latter" prophets. The former comprised the books of Joshua, Judges, Samuel, and Kings. Among the latter they again distinguished between the "great" (Isaiah, Jeremiah, and Ezekiel) and the 12 "minor" prophets (Hosea, Joel, Amos, Obadiah, Jonah, Micah, Nahum, Habakkuk, Zephaniah, Haggai, Zechariah, and Malachi). In the arrangement of modern biblical criticism, Joshua, Judges, Samuel, and Kings are not counted among the books of the prophets, which are divided into the 4 great (Isaiah, Jeremiah, Ezekiel, and Daniel) and the 12 minor prophets. For a fuller account, see the articles upon the individual prophets.

PROPONTIS. See Marmora, Sea of.

PROPORTION, in mathematics, the relation of one quantity to another. This relation may be expressed either by the difference of the quantities or by their quotient. In the former case it is called arithmetical relation, in the latter geometrical proportion, or simple proportion. The measure of this latter relation is called the ratio; that is to say, ratio is the number of times one quantity contains another taken as a standard. The following algebraic expression is called a proportion: $a : b :: c : d$, which means that the ratio of a to b is the same as the ratio of c to d. A proportion may thus be defined to be an identity of ratios. In the above expression a, b, c, and d are called the terms of the proportion; a and d the extremes; b and c the means; a and c, antecedents; b and d, consequents.

PROSERPINE, or Persephone, in Greek and Roman mythology, the queen of the infernal world. She was the daughter of Jupiter and Ceres, and was beloved by Pluto, who forcibly carried her off to Hades. There she was found by Ceres, who induced Pluto to consent that her daughter should pass 8 months of every year in the upper world with her. Through this story Proserpine became with the ancients a symbol of vegetation. The Eleusinian mysteries belonged to her in common with her mother, and she had temples at Corinth, Megara, Sparta, and at Locri in the south of Italy.

PROSODY (Gr. *προσῳδια*), that part of grammar which treats of quantity, accent, versification, and the laws of harmony in metrical composition. In the modern European languages prosody has to do almost wholly with accent, but Greek and Roman versification was governed by the quantity of syllables, that is, the length of the vowels in them. In English prosody the adjectives "long" and "short" are used respectively to denote accented and unaccented syllables, and these are indicated by the signs – and ⏑. A group of syllables taken together is called a measure. The different kinds of measure are the following: iambus, ⏑ –; trochee, – ⏑; spondee, – –; pyrrhic, ⏑ ⏑; dactyl, – ⏑ ⏑; amphibrach, ⏑ – ⏑; anapæst, ⏑ ⏑ –. Metre consists essentially in the recurrence at certain intervals of syllables similarly accented, or in other words of the arrangement of measures according to certain rules; and metres are demominated from the kind and ngement of the measures of which they are posed. The iambus forms the iambic ometer, dimeter, trimeter, tetrameter, pen-ater (heroic measure), hexameter (Alexan-e), and heptameter, in which the measure rs respectively from one to seven times ach verse. There are the same varieties rochaic measure; the dactyl, amphibrach, anapest have the first four, and there is a dactylic hexameter so called, the last sure of which is a spondee. Longfellow's angeline" is written in this metre. Most se metres admit of an additional unaccented able at the end of the line, and sometimes e beginning, as in the following amphibrach ameter from Goldsmith:

aks, my lord, for | your venison; | for finer | or fatter
er ranged in | a forest | or smoked in | a platter.

the amphibrach and dactylic measures a syllable is sometimes wanting; thus:

Ye shepherds | so cheerful | and gay.
Peace to thee, | isle of the | ocean.

ombination of several lines constituting a lar division of a poem is a stanza, and stan- may combine a variety of measures. The serian stanza consists of 9 iambic lines, first 8 being heroics and the last an Alex-rine. Gay's stanza contains 8 iambic tri-ers, the 1st, 3d, 5th, and 7th lines having additional final syllable. Elegiac octosyl-s are iambic tetrameters with alternating mes; octosyllabic couplets, iambic tetrame- with pairs of rhymes, one foot occasionally g a trochee; octosyllabic triplets, iambic ameters with 3 rhymes regularly in suc-ion; heroic couplets and triplets, iambic ameters with rhymes in pairs or triplets; iac heroics, the same with alternating mes; rhymes royal, 7 heroics, of which the 2 rhyme with each other, and the re-ing 5 may be made to rhyme in various s; and *ottava rima*, 8 heroics, the first 6 ming alternately, and the last 2 in suc-ion. *Terza rima*, which has been bor-ed like the last from the Italian, consists ambic pentameters in which the following es rhyme with one another: the 1st and the 2d, 4th, and 6th; the 5th, 7th, and and so on; the stanza ends abruptly, and last rhyme, like the first, is on a couplet ead of triplet. This is the metre of Dante's *ina commedia*. Ballad stanzas are of 4 iam- lines, the 1st and 3d being tetrameters and 2d and 4th trimeters. Service or common re consists of iambic heptameter couplets, h may be divided into ballad stanzas. g metre is a stanza of 4 iambic tetrameters, ming either in couplets or alternately; and t metre 4 iambic lines, of which the 1st 3d are trimeters and the 2d and 4th tetra-ers. There are several other kinds of ra in more or less frequent use, one of the t curious of which is the old "poulterer's sure," consisting of Alexandrines and iam- heptameters alternately.

PROTAGORAS, a Greek philosopher, born in Abdera probably about 480 B. C., died about 411. The common story in regard to his origin was that he was a porter, and attracted, by the skilful manner in which he carried his load, the attention of Democritus, who undertook the task of educating him. He travelled throughout Greece, giving instructions in philosophy to large numbers of pupils. Twice at least he visited Athens, and seems to have been on intimate terms with Pericles. He was the first who assumed the title of sophist, as denoting one who instructed others in the art of becoming wise, and in the arts of eloquence and politics, and was also the first who received pay for his lessons. According to Plato, he received more money during the 40 years in which he taught than Phidias and 10 other sculptors. None of his works are extant. In his treatise "On the Gods," Protagoras started with the following proposition: "Respecting the gods, I am unable to know whether they exist or do not exist." For this statement he was banished from Athens, where he was then residing, and his books were burned. According to some he was drowned on a voyage to Sicily.

PROTECTOR, LORD, in English history, a title conferring extraordinary powers, which has been several times conferred by parliament during political emergencies. The most celebrated lord protectors were Richard, duke of Gloucester, whose protectorate ended in his becoming king as Richard III.; Edward Seymour, duke of Somerset, uncle to Edward VI.; and Oliver Cromwell and his son Richard.

PROTESILAUS, a Thessalian prince, the first Greek slain in the Trojan war. It is said in the Iliad that he was the first who leaped from the ships upon the Trojan shore, and according to the ancient tradition recounted in Lucian he was killed by Hector. The great affection toward Protesilaus of his wife Laodamia is celebrated by the poets. After his death she prayed to be permitted to converse with him only for the space of 3 hours; the prayer was granted, Mercury conducted Protesilaus to the upper world, and when he died a second time his wife died with him.

PROTEST (Lat. *protestor*, to testify or declare against), a term used in many ways and for many purposes. One who is called upon to pay an import duty, a tax, a subscription, or the like, which he thinks he ought not to be required to pay, but is unwilling to encounter the delay and expense of a lawsuit at that time, pays the sum demanded under protest; that is, he accompanies the payment by a written and attested declaration of what he deems the illegality of the demand, and of his rights of defence and denial. This protest preserves all those rights; and in any subsequent suit or other effort to get the money back, the protest will prevent him from being impeded by his payment.—In legislation, the members of a deliberative body who dissent from the views of a majority, and have no power to prevent those views from going into effect, sometimes ask leave to put on the record of the body a declaration of their views, drawn up and signed by them. This is called their protest against the measure; and leave to record it is usually given, if it be decent and temperate in its terms, and does not state what the majority regard as wilfully false or impertinent.—If a vessel be wrecked, or meet with other injury from any peril of the sea, it is an ancient and nearly universal custom for the master, on his arrival at port after the injury, to appear before a notary public, or some competent magistrate, or in their absence some respectable and qualified person, and enter his protest against the accident or peril. In this protest he details the circumstances with sufficient fulness to sustain his declaration that the injury occurred, not through the fault of the vessel, but by reason of the peril stated. In the absence or disability of the master, the protest is made by the officers, or even by the seamen; and when it is made by the master, he is usually accompanied by one or more of the officers, and by some of the seamen.—A very important use of protest is made in the case of dishonored bills of exchange. (See EXCHANGE, BILL OF.) It is a universal law that a foreign bill of exchange, if not accepted, or if not paid at maturity, must be protested in order to hold all the parties to it. In this sense, the states of the Union are foreign to each other. Inland (or domestic) bills and promissory notes are often protested in the same way; but this usage, so far as it exists, has grown up from the convenience of it, and not from any requirement of the law merchant. The protest should be made by a notary public; and full faith is given in all countries to all the official acts verified by his seal, which acts are required by law merchant. He cannot properly delegate this power to any clerk or substitute. An acceptance or payment *supra* protest takes place when, a bill having been protested, a third person intervenes, and accepts or pays the bill for the honor of the party whose duty it was to accept or pay it; and this gives him a right to indemnity from the person for whom he accepts or pays. An acceptance or payment *supra* protest is sometimes called an acceptance or payment for honor. Generally, where one accepts or pays for honor without designating for whose honor he acts, it will be deemed that he acts for all who were bound by the paper, and he acquires his right of indemnity against all whom he thus protects. But he may designate, if he choose to, the party for whose honor he acts, and then he protects only that party, and has no claim or rights against any other.

PROTESTANT, a collective name for a large class of Christian denominations, embracing in general all except the Roman Catholic and eastern churches. The name originated in 1529 in Germany, at the diet of Spire. The majority of the members of the diet, in union with the representative of the emperor,
had passed a resolution that those estates w
had shown themselves favorable to the
mation should prohibit, until the conv
of an œcumenical council, all further in
tions in religious matters, and in par
should not allow any alteration in the
bration of the Lord's supper or the mass
this resolution the evangelical estates,
ing of the elector of Saxony, the mar
of Brandenburg, the duke of Brunswick-L
burg, the landgrave of Hesse, the prin
Anhalt, and 14 imperial cities, refused t
mit. They declared their readiness to
the emperor and the diet in all "duti
possible matters;" but against any ord
sidered by them repugnant to "God an
holy Word, to their souls' salvation an
good conscience," they entered, on Apr
solemn protest. Henceforth they were
the Protestants. The origin of the name
defines its original signification. The
of the first protest did not fully agree
their theological views; but they did ag
the protest against the authority of secu
ecclesiastical boards to compel obedien
matters of faith, and the name Protestant
fore came early into use as the col
name for all the Christian denominat
Switzerland, France, England, Scotland
land, and other countries which proclaim
Bible to be the only rule of faith.—The ag
gate number of the Protestant popula
the five great divisions of the world may be
from the following figures, taken from
"Ecclesiastical Year Book" for 1859:

I. AMERICA.—British America, 2,200,000; United S
21,000,000; South America, 20,000; Dutch p
85,500; Danish and Swedish possessions, 55,
2,000; total, 28,812,500.

II. EUROPE.—Portugal, 7,000; Spain, 5,000; France,
Austria (including Venetia), 8,868,152; Prussia
898; the other German states, 11,240,176; Italy
Switzerland, 1,417,754; Holland, 1,990,304;
25,000; Great Britain (including Gibraltar, M
Helgoland), 22,000,000; Denmark (including
1,887,000; Sweden and Norway, 5,067,000;
8,918,000; Turkey, 10,000; Ionian isles, 2,00
62,827,206.

III. ASIA.—Asiatic Russia, 40,000; China (with Hong K
10,000; East Indies (with Ceylon and Ind
800,000; Asiatic Turkey, 6,000; Indian arc
50,000; Persia, 1,000; Arabia (with Aden), 2,0
409,000.

IV. AFRICA.—Cape of Good Hope, 250,000; other co
of southern and western Africa, 400,000; Algeria
Egypt, 2,000; Liberia, 50,000; total, 712,000.

V. AUSTRALASIA and POLYNESIA, 1,820,000.

Total in all five divisions of the world, 88,080,706.

PROTEUS (Laurenti), or *hypochthon* (Mer
a perennibranchiate batrachian reptile, be
ing to the same family as the axolotl and
menobranchus. The skin is naked and sli
the body elongated and cylindrical, and
tail short, broad, and compressed laterally;
branchial tufts are 3 pairs, and persistent
ing life; legs 4, rather weak, the anteri
toed and the posterior 4-toed. The com
proteus (*P. anguinus*, Laur.) is about a
long and ½ inch in diameter; it is pale fle
colored or white, with the branchial
bright crimson; the teeth are small and
in both jaws and on the palate; the head

gular, and the snout obtuse; the eyes are ry small, and without lids. It is found only the subterranean waters of some caves of urope, as in Carinthia, Carniola, the Tyrol, nd especially in the Adelsberg cavern in Carniola. The respiration is essentially aquatic y means of the branchial tufts, though it has dimentary lungs, rises to the surface to swalw air, and can live a short time out of the ater, like the menobranchus; its motions by eans of the legs are sluggish and awkward, ut it swims with considerable rapidity and se by the lateral undulations of the tail and ody; when the water of its subterranean reeat becomes low, it buries itself in the mud, ke others of the family; the food consists of quatic worms and insects, and soft-shelled ollusks. Several local varieties occur, generlly considered as belonging to the same speies; one of these is of a purplish color with ellow spots, and larger, widely extended, and oarsely divided gills; these are described as pecies of *hypochthon* by Fitzinger in the *Sitzungsberichte* of the academy at Vienna for Oct. 850, pp. 291-303. (For the fish called the roteus of the lakes, see MENOBRANCHUS.)

PROTEUS, in Greek and Roman mythology, sea god subject to Neptune, whose flocks he ended. He had the gift of prophecy. At idday he always arose from the flood and lept in the shadow of the rocks on the coast, and those who desired him to foretell the future were obliged to seize him at that time. In his ndeavors to escape he would assume various hapes to terrify or disgust, and thus drive way his questioner; but when he found this ubterfuge of no avail, he would return to his proper shape and yield to the demand.

PROTOGENES, a Greek painter, who flourished toward the close of the 4th century B. C. He was born at Caunus in Caria, and for 50 years lived unnoticed and poor at Rhodes, until through the intervention of Apelles the Rhodians became aware of his merit. When Demetrius Poliorcetes besieged the city, he was careful not to attack the most defenceless part, because it contained the works of Protogenes. He spent so much time in the elaboration of his works, that Apelles said he never knew when to take his hand off his picture. The Ialysus was considered his masterpiece, and this when Pliny wrote had been carried from Rhodes to Rome, and was there preserved in the temple of Peace. Protogenes was also a statuary, and according to Suidas wrote on art.

PROTOZOA, a division of invertebrate animals proposed by Siebold, and since adopted by Leuckart and Vogt, but denied by other naturalists. As generally defined, it contains the foraminifera, polycystina and rhizopoda generally, the sponges, and the true infusoria, which may be characterized as having a simple or structureless organization, reducible to a cell or cell contents, without any distinct separation of systems of organs. Prof. Agassiz, adhering to Cuvier's 4 great fundamental branches of the animal kingdom, neither more nor less, viz., vertebrates, articulates, mollusks, and radiates, could not admit a 5th, the protozoa, and accordingly, in the "Essay on Classification," distributes the animals thus named partly among plants (algæ), and partly among embryonic forms of acephalous mollusks, worms, and crustaceans; it having been ascertained that the corallines are algæ with more or less lime in their structure, and that there is hardly a group among the lower animals and plants which does not contain simple locomotive individuals (though in the latter the locomotion is not voluntary), as well as free and fixed compound communities, he is inclined to associate the rhizopods with algæ, which have ovoid masses somewhat resembling the germinal granules of the former. This group is called *protozoa*, as representing the first step in animal organization, and oozoa by Carus from their analogy to the ova or germs of the higher classes.

PROUDHON, JEAN BAPTISTE VICTOR, a French jurist, born at Chasnans, department of Doubs, in 1758, died in Dijon in 1838. During the revolution he was judge at Pontarlier, assistant deputy to the legislative assembly, and afterward a member of the civil tribunal at Besançon. In 1802 he delivered free lectures on law, which attracted considerable attention; in 1806 he was appointed professor of civil law in the school of Dijon, and in 1809 became dean of the faculty. On the return of the Bourbons he was removed from this post; but none of his colleagues having consented to take it, he was restored. His works, in 21 volumes, are among the treasures of French jurisprudence.

PROUDHON, PIERRE JOSEPH, a French political writer, born in Besançon, July 15, 1809. He is the son of a cooper, and after studying for some time, through the assistance of some benevolent persons, at the college of his native city, became apprentice to a printer, and in 1837 was taken into partnership by a printing firm at Besançon. Having devoted much of his leisure to study, and particularly to philology, he published an edition of the Bible with annotations upon the principles of the Hebrew language, and reprinted Bergier's *Éléments primitifs des langues* (1837), with an anonymous *Essai de grammaire générale*, by himself, as an appendix. This essay, afterward reprinted in separate form (1850), received from the academy of that city a prize consisting of a pension of 1,500 francs, which enabled him to visit Paris. Here he became a contributor to Parent Desbarres' *Encyclopédie Catholique*, and wrote for the Besançon academy a prize essay, *De la célébration du dimanche* (1840), and a paper entitled *Qu'est-ce que la propriété?* This pamphlet, which opened with the afterward celebrated dictum, *La propriété, c'est le vol*, was censured by the academy, who at once cut short Proudhon's allowance, and would perhaps have brought him before a court of justice had not the economist Blanqui, who had been appointed to examine it, declared that he found nothing objectionable in it. It was followed in 1841 by another pamphlet upon the same question, and in 1842 by an *Avertissement aux propriétaires*, for which he was arraigned before a jury at Besançon, but acquitted. In the same year he quitted the printing business and became director of a company of freight boats on the Saône and Rhone. In the mean time he continued to propagate his opinions in his *De la création de l'ordre dans l'humanité* (1843), presenting the theory of a new political organization, and *Système des contradictions économiques* (2 vols. 8vo., 1846). On the breaking out of the revolution of Feb. 1848, he was engaged in the publication of his *Solution du problème social*, a plan of social reform by means of a new organization of credit and monetary circulation. On April 1 he became the editor of *Le représentant du peuple*, a daily journal of radical opinions, through which he gained considerable popularity. On June 4 he was elected deputy to the constituent assembly, and was accused of being implicated by sympathy and advice in the bloody contest that took place toward the close of that month, but the accusation was not sustained. On July 31 he came forward in the assembly to urge a proposition which he had previously made for the establishment of a progressive income tax, the design of which was the abolition of interest on capital, and eventually the consolidation of the republican government. This was almost unanimously voted down by the assembly, "as an odious attack upon the principles of public morality and an appeal to the worst passions." He closed his parliamentary career by opposing (Nov. 4) the adoption of the constitution, which he looked upon as "dangerous to liberty." He now returned to his former pursuit, and edited in succession 3 short-lived journals: *Le peuple*, from Nov. 23, 1848, to April, 1849; *La voix du peuple*, from Oct. 1, 1849, to May 16, 1850; and *Le peuple de* 1850, from June 15 to Oct. 13, 1850. These papers, rash and violent in their tone, were repeatedly condemned by the courts, but the fines imposed upon the editor were immediately paid by subscriptions from that portion of the people who admired him as the harbinger of social revolution. His printed speeches and pamphlets, including his *Droit au travail* (1848), *Les Malthusiens*, *Démonstration du socialisme*, and *Idées révolutionnaires*, found a ready sale among men of all opinions, and elicited answers from the ablest pens among the conservative party. As early as Jan. 1849, he had undertaken to establish *la banque du peuple*, an institution of gratuitous credit, by means of which he hoped to bring his theory into operation; but in this he was interrupted, March 28, by a sentence of 3 years' imprisonment for illegal publications, which he at first avoided by flight. After sojourning in Geneva for a few months, he delivered himself up (June 4), was incarcerated successively in the Conciergerie, at Doullens, and in the prison of Ste. Pélagie, where in 1850 he married a merchant's daughter. During his imprisonment he wrote *Confessions d'un révolutionnaire* (1849); *Acta de la révolution* (1849); *Gratuité du crédit* (1850); and *La révolution sociale démontrée par le coup d'état* (1852), which created a deep sensation and was looked upon as a partial apology for Napoleon's policy. Liberated June 4, 1852, Proudhon remained for a while in retirement; but in 1856 he reappeared with a *Manuel des opérations de la bourse*, a satire on stockjobbers and speculators; and soon afterward published *De la justice dans la révolution et dans l'église, nouveaux principes de philosophie pratique* (3 vols., 1858), which he ironically dedicated to the archbishop of Besançon. This metaphysical work, a covert attack upon the established order of things, was seized by the police, and its author was sentenced to 3 years' imprisonment and a fine of 4,000 francs. The amnesty granted to the press by Napoleon III. set him at liberty. His latest work is entitled *La paix et la guerre* (2 vols., 1861).

PROUT, Samuel, an English water-color painter, born in Plymouth, Sept. 17, 1783, died Feb. 10, 1852. In early life he was a companion of Haydon. Some sketches of Cornish scenery which he executed for Britton the antiquary first brought him into notice, and in 1805 he removed to London. In 1818 he visited the continent for the first time, and in the mediæval architecture of Rouen and other old Norman cities discovered a class of subjects singularly suited to him. Thenceforth he devoted himself to architectural subjects, visiting the oldest cities of France, Switzerland, Germany, the Netherlands, and Italy, and making sketches of quaint streets and market places, and picturesque buildings. His spirited "Facsimiles of Sketches made in Flanders and Germany" (fol.), "Sketches in France, Switzerland, and Italy" (fol., 1839), with other series of lithographic copies of his sketches, have made this class of his works widely known. He also published a series of studies and drawing books for pupils; "Antiquities of Chester" (imp. 4to.); "Hints on Light and Shade, Composition, &c., as applicable to Landscape Painting" (fol., 1838); "Microcosm, the Artist's Sketch Book of Groups of Figures, Shipping, and other Picturesque Objects" (fol., 184[illegible]); "Hints for Beginners," &c.; beside making drawings for annuals and other works. The "Art Journal" for 1849 contains a memoir of him by Ruskin, who ranks him among the first of water-color painters.

PROUT, William, a Scottish physician and chemist, born in 1786, died in London, April 9, 1850. He received his professional education at the university of Edinburgh, but passed the greater part of his life in London. His researches on the application of chemistry to the explanation of the phenomena of life are contained in an important work entitled "On the Nature and Treatment of Stomach and Renal Diseases" (5th ed., 1848.) He also published

Chemistry, Meteorology, and the Function Digestion considered with reference to Nat- al Theology," a Bridgewater treatise; "An quiry into the Nature and Treatment of ravel," &c.; and a number of papers in the ientific magazines and transactions of various cieties. He is considered the pioneer in the ovement which has so intimately connected emistry with the treatment of disease.

PROVENÇAL POETRY, the name given to e literature which prevailed in the south of rance and adjacent countries from the end of e 11th to the middle of the 14th century. lthough these are the limits within which it ordinarily confined, its existence dates as r back as the 8th century, when the Romance iom of the south began to take the place of e Latin. In that part of the country traces the Græco-Roman paganism, such as popular orts and dances, accompanied with amatory d licentious songs, could be found long af- r paganism itself had passed away. After renuous efforts the clergy found themselves able to put an end to these practices, and tempted to sanctify them by adapting them the ceremonies of the Christian faith. The lemnities of public worship were dramatized, d a visible representation was given to the cts and incidents in the early history of the urch. Accompanying these ceremonies rang up a popular poetry, a vague recollec- on of the hymns of the old religion. The nguage, the Romance Provençal or *langue* c, was based upon the Latin, but a Latin rrupted by popular usage and by collision ith the 5 ancient tongues of Gaul. Into this ialect were moreover adopted Greek, Teu- nic, and Arabic words. It became gradually xed and polished, partly by the pious songs the monks, and as early as the year 1000 oems were written in it, which at that time ere celebrated, although very little from that eriod has come down to us. From the people e poetry of the vulgar tongue ascended to e courts and castles. By the end of the 11th entury the language had become fixed, with a eterminate grammar, and with considerable ower of expression, and it contained poetical ompositions, with a system of versification ounded on a combination of rhyme with the yllabic accent. The word *trobar* (Fr. *trouver*, o find, to invent) was in use to denote the cre- ative act of the imagination, and from it the itle of troubadours was given to those who ultivated poetry. Under such circumstances he Provençal literature entered at the opening of the 12th century on a course of rapid development, in which it was materially favored by he condition of the country. The south of France for several centuries had been and continued to be comparatively undisturbed by the wars which laid waste other parts of Europe. The Visigoths and Burgundians who settled in it were by far the most civilized of all the barbarian races. In 879 the kingdom of Arles was founded by Boson, and was ruled by his descendants, 12 princes of the Burgundian line, until 1112, when the crown of Provence came into the possession of Raymond Bérenger, the third count of Barcelona. Under the new political division the south of France was as peaceful and as prosperous as under the old, and before the end of the 12th century the fame and the poetry of the troubadours had penetrated into nearly every country in Europe. The *gai saber* or "gay science," as that literature was called, according to the doctrines of which love was the principal of all virtue and of all glory, was chiefly protected and encouraged in the courts of Provence, the country in which it sprang up, in the dominions of the count of Toulouse, and in the kingdom of Aragon, which in 1137 became subject to the counts of Barcelona. But it was also popular in many other courts, especially in that of Castile. The language itself was the dominant one in all France south of the Loire, and also prevailed in Catalonia, Valencia, part of Aragon and of the north of Italy. Castilian writers attribute the origin of their poetry to the Provençal, or, as they term it, to that of the Limousin; while in Italy, long after the troubadours themselves had passed away, their works were admired and imitated. The poems upon which their celebrity chiefly rests are lyrical. They are divided into symmetrical strophes, and the system of versification was carried to the highest degree of refinement and intricacy. Moreover, in no other literature, except the Arabic, has the taste for rhyme been carried to so great an extent. As the poems were written to be sung with a musical accompaniment composed by the poet himself, there early sprung up a class called *jongleurs* (Lat. *joculatores*), who made it their business to recite the songs of others and sometimes their own. Of these some led an independent life, making their way into courts, castles, and all places where bodies of men were assembled; others were in the personal service of some distinguished troubadour. To the jongleurs, and the manner in which they made a trade of their art, the troubadours themselves attributed the decay of their poetry, although the profession of jongleur was at one time a kind of poetic apprenticeship, which custom required almost invariably to be imposed.—Of the numerous varieties of lyric composition cultivated by the troubadours, the most important were the following. 1. The *canso* (chant or chanson) or chivalric love song, in which they celebrated the beauty or virtue of their ladies, or gave expression to chivalric passion. In numbers and importance poems of this form far exceed those of all others, as the canso was considered superior to all other kinds of amatory poetry. 2. The *sirventes*, or satires, were all poems which either had not love for their subject or did not treat it seriously, but more particularly those in which the troubadours assailed the vices of their age, abuses in the church, or the brutalities of the feudal lords. In this form they were very bold, being deterred by no considerations of fear from denouncing acts of injustice. 3. Historical pieces, sometimes included also under sirventes, usually in reference to the crusades in the East or against the Arabs of Spain, or depicting the contests of the smaller feudal powers. Under this head was included the *prezicansa* or poetical exhortation to enterprises of this kind. Poems of this sort were usually recited by the jongleurs. 4. The *tensons*, or poetic combats, in which two or more interlocutors are represented as supporting opposite sides on some point in the philosophy of chivalric love. This, though a favorite, was necessarily the most didactic and the least poetical form in which their productions were written. Under it were included the *partimen jocx-partitz* or *partia* and the *tourneyamen*. 5. The epistles, in which they treat of love, friendship, and also of moral and religious subjects. The *donaire*, *saluts*, *ensenhamen*, and *conte* were varieties of this form. 6. The *planh*, a kind of elegy, in which they celebrate the memory of a fallen knight or the disappointments of love. 7. The *balada*, the ballad and the round, little poems sung by an indefinite number of persons, and accompanied with dancing. Compositions of this form seem to have been abandoned to the women. 8. The *serenas*, or serenades, and the *albas* or *aubades*, waking songs, poems of a remarkably delicate and impassioned character, very few of which have come down to us. The latter were put into the mouth of one of the parting lovers, or of one of the companions of the knight, or generally of a sentinel giving warning of the coming of the day. 9. The *pastoretas* or *vaqueyras*, pastorals, which usually recited conversations between discreet shepherdesses, tending a few lambs, and troubadours riding by, in which the latter utter compliments they do not mean, and to which the former are careful not to attach any value. The 3 last forms were of a more popular character than the others, being rarely or never heard in the courts, and constitute a distinct group in the system of Provençal poetry. There were a large number of other terms in use by the troubadours, either synonymous with those mentioned or denoting other varieties of poetic compositions. Beside these lyrics there were narrative poems, the most ancient of which were based upon some incidents connected with the first crusade. But the Provençal was wanting in dramatic compositions, or if they existed even in a crude form none have come down to our time. The decline of the literature was marked toward the close of the 13th century by the composition of "treasuries," written in verse, and containing an account of human knowledge as it then existed, and also by the production of histories and chronicles, some of which were in prose. The most remarkable fact in connection with the "treasuries," the encyclopædias of their age, was their narrow range of knowledge.—William IX., count of Poitou (died 1127), though not the most ancient of the troubadours, first whose works have come down to us, entire or in fragments, and is therefore placed at the head of the Provençal Brave, active, and a libertine in private, "he understood," say the biographical notions of the troubadours, "the art of making verses and of singing to perfection, and about the world a great while in order to impose upon the ladies." Giraud de Borneil, the greatest of the Provençal poets, according to the decision of his contemporaries, and those speaking his language; but this was disputed by Dante and the Italian poets of the 14th century, who awarded the palm Arnaud Daniel. Among the names of and nobles prominent as troubadours are of Richard Cœur de Lion and his contemporary Bertrand de Born, who acted so conspicuous part in fomenting civil war between the members of the royal family of England, and obtained an unpleasant immortality Dante, by whom he is placed in hell with head severed. Beside these, some of the celebrated were Arnaud de Marveil, attached to the court of Roger II., viscount of Beziers, called Taillefer; Rambaud de Vaqueiras, distinguished as a warrior as well as a poet, who was made a knight by Boniface I marquis of Montferrat; Pierre Vidal of Toulouse, who accompanied Richard of England on the third crusade; Pierre Cardinal of in Velay, the greatest satirical writer of troubadours; and Giraud Riquier of Narbonne, who belonged to the court of Alfonso X Castile. Moreover, among the poetical works of the Provençal troubadours which still remain, are to be found compositions by women, some of whom were ladies of high rank. They were called *trouveresses*, and most of flourished within the second half of the century.—The decline of Provençal poetry, which began about the middle of the 13th century, was due partly to defects inherent itself, but chiefly to political causes. The ignorance of the troubadours was amazing. Scarcely an allusion can be found in their works to the mythology or history of the ancients, and the treasury of Pierre de Corbiac, evidently regarded by its author as displaying a miraculous erudition, mentions only the name of Ovid among the Latin poets, and him calls a liar. The language and poetry of Provence rapidly declined in the crusade against the Albigenses, and the wars which during the first half of the 13th century desolated the south of France. The sovereign families, the great patrons of the troubadours, disappeared. The family of Provence failed in 1245, and the territory possessed by it was claimed by Charles of Anjou; in 1249 the house of *Toulouse* also became extinct. From this time the Provençal poetry rapidly declined, and its fall was hastened by the hatred felt for it by the church. In the contests between the clergy and the feudal lords, the troubadours had rarely failed take the side of the latter, and in the war xtermination waged against the Albigenses cely any of them were found on the side the crusaders. In 1245 Innocent IV. issued ull, in which he called the Provençal the guage of heretics, and forbade its use by dents. The inhabitants of the south of nce not only found themselves forced to mit to a yoke which they hated, but beheld ir literature overshadowed by that of the rth. From 1250 to 1290 only a few trouba- re of any eminence flourished, and in the h century Provençal poetry can hardly be d to have existed in the country of its ori- . The language, moreover, passed into a lect, which, with various modifications and rations, still lives among the peasantry. But parts of Spain it continued to be cultivated h success for many years. During the 12th l 13th centuries, the literature and literary on of Catalonia were the same as the Pro- çal, and the list of troubadours is enriched h the names of Catalan nobles and kings Aragon. Long after the genuine race of vençal poets had passed away, Provençal try was carried to a high degree of perfec- n by the inhabitants of Valencia. When the sade against the Albigenses drove the trou- dours from their homes, many sought refuge the court of Aragon, and gave to Saragossa l Barcelona the attractions once belonging Arles and Marseilles. But even there it did long survive. At the beginning of the 14th tury it had ceased to exist in Castile, and ward the close of that century was displaced n Catalonia and Aragon, or rather corrupted the idiom of those countries. It did not , however, without a struggle. In 1323 an empt was made to revive it by the magis- cy of Toulouse, who formed a guild in that y under the name of the "Very Gay Com- ny of the Seven Troubadours of Toulouse," l in 1355 established a body of laws under title of "Ordinances of the Seven Lords nservators of the Gay Science," which laws ulated for centuries afterward the floral mes celebrated in that city on the first of y. At the request of John I. of Aragon two the conservators of Toulouse went in 1390 Barcelona, and established there a consistory the gay science, which was afterward re- ved to Tortosa. This institution attained to nsiderable renown in the following century, en for a period the Provençal poetry, modi- l by the ruder but more vigorous idiom of talonia, held sway. But the Provençal ally disappeared as the language of the high- classes, though it still lives in the rustic dia- ts of Catalonia and Valencia. In Italy it o gave way to the Tuscan idiom, enriched by genius of Dante, and was forgotten in the vival of the ancient literature which in that ntry early absorbed the attention of all n of genius. Still, in spite of the overshad- ving influence of other tongues, the Provençal continued to be, at least in the south of France, until the present time, a medium of poetic composition, and some of those using it have acquired celebrity. Of these the most famous is Jasmin of Agen. (See *Jasmin*.)—The earliest writers on the Provençal literature were Cardinal Bembo and Jean de Nostre Dame, or Nostradamus, brother of the astrologer. Nostre Dame collected a large number of manuscripts, and composed a work on the lives and writings of the old Provençal poets. But the language was especially indebted to Lacurne de Sainte-Palaye, who expended a vast amount of time and labor in ransacking the libraries of France and Italy, and collecting materials on the subject. At the time of his death, however, the lexicon undertaken by him had not been completed, and the mass of matter collected had not been digested or published. It is chiefly to M. Raynouard, a native of Provence, that we are indebted for our knowledge of the Provençal. In his *Choix des poésies originales des troubadours* (6 vols., Paris, 1816–'21), he published vestiges of their early poetry, and lives and extracts from the writings of about 350 poets. Previously he had written a grammar of the language (Paris, 1816); and to this he added a lexicon which appeared after his death (6 vols., Paris, 1836–'45). In his footsteps followed Charles Claude Fauriel, whose *Histoire de la poésie Provençale* (3 vols. 8vo., Paris, 1846), delivered in a series of lectures as professor in the faculty of letters at Paris, is the most elaborate work on the subject upon which it treats. Since the labors of Raynouard and Fauriel, numerous works and essays have been written upon the poetry of the troubadours in France, and in Germany and Italy it has also received considerable attention. No original treatise upon the subject has yet appeared in English. A translation by G. J. Adler of a little more than one half of Fauriel's work was published at New York in 1860.

PROVENCE, an ancient province in the S. E. of France, bounded N. by Dauphiné and Venaissin, E. by the Alps, S. by the Mediterranean, and W. by Languedoc. Capital, Aix. It was divided into Upper and Lower Provence, watered by the Rhone, Durance, Sorgues, Argens, Arc, Verdon, and Var, and celebrated for its delightful climate and rich fruits, though the soil is somewhat arid. It now forms the departments of Basses-Alpes, Bouches-du-Rhône, and Var, and a part of those of Vaucluse and Drome.—Provence was for a long time the only territory to which the Romans gave the name of *provincia*. It passed into the hands of the Visigoths in the 5th century, and of the Ostrogoths in the 6th, and, after being for a while in the possession of Austrasia, fell to Lothaire on the division of the empire of Charlemagne. In the 10th century it formed part of the kingdom of Arles, which was subsequently united to the kingdom of Germany; but Provence meanwhile was governed by virtually independent counts, who about 1063 became hereditary. The last count bequeathed it to King Louis XI. in 1481, and it was thereafter an integral part of the French monarchy.

PROVERB, a short, pithy saying, which embodies some well known truth, and is often indeed a truism, but acquires significance by its application. Erasmus defines it as "a well known saying remarkable for some elegant novelty;" Cervantes as "a short sentence drawn from long experience;" and Lord John Russell as "the wit of one and the wisdom of many." Proverbs are perhaps as old as any writing of which we have knowledge. Hesiod preserved a good many, and Erasmus pointed out the sources of some in the responses of oracles, the verses of poets, and the allegorical symbols of Pythagoras. The familiar adage: "Evil communications corrupt good manners," was quoted by St. Paul, and is found in a fragment of the comic poet Menander. Cicero made frequent use of proverbs from the Greek. Aristotle, struck by the condensed wisdom of proverbial sayings, supposed them to be the wrecks of an ancient philosophy saved from the ruin in which the rest of the system had been lost by their elegance and shortness. The speech of Odin in the "Edda" contains many which are very characteristic of the life of the ancient Scandinavians; and the Spaniards attribute to their "sayings of old wives by the fireside" a greater antiquity than they claim for any written document in their language. The proverb is so nearly allied to the motto, symbol, device, sentence, apologue, and fable, that it is not always easy to draw the line of distinction. Howell describes the ingredients of a good proverb to be "sense, shortness, and salt;" and George Herbert pithily indicated its brevity and deep meaning when he spoke of it as "a dart" (*jaculum*). Bacon remarks that "the genius, wit, and spirit of a nation are discovered in its proverbs." Those of Spain are in advance of those of any other country in point of number, originality, and elegance. Many of the tritest and seemingly most national Scotch and English proverbs have been borrowed from the East; and even the famous old saw, "to carry coals to Newcastle," has a prototype not only in the Persian saying, "to carry pepper to Hindostan," but also in the Hebrew, "to carry oil to the city of Olives."—Collections of proverbs have been made from very ancient times. Zenobius and Diogenianus in the 2d century gathered, the former 552, and the latter 775. Polydore Vergil published a volume of *Adagia* in 1488, and Erasmus another soon afterward containing about 5,000. Michael Apostolius of Byzantium left a collection of 2,000 ancient proverbs, which were printed at Leyden in 1653. There are Spanish collections by Mendoza, marquis of Santillana (1508); Pedro Valles (1549); Hernan Nuñez de Guzman (1555); Mal Lara (1568), under the title of *La filosofia vulgar;* Oudin (Paris, 1608); and Cejudo (1695), with corresponding Latin adages. Juan de Yriarte afterward gathered about
24,000, and there is another collection b
pulles in 6 volumes. Florio gives 6,0
ian proverbs in his *Giardino di ric*
(1591); and there are similar works by
sini (1604) and Varini (*Scuola del vulg*
Oudin published a collection of Frenc
erbs under the title of *Curiosités Fr*
and Fleury de Bellingen an *Explica*
proverbes François. There is a Danish
tion with a French translation (Cope
1757); Sailer published in German "T
dom of the Streets, or the Meaning a
of German Proverbs" (Augsburg, 181
John Ray prepared in 1670 a collec
proverbs in various languages, comprisin
lish, Scottish, Welsh, Irish, Danish,
and Hebrew, which has been repri
Bohn's "Antiquarian Library" under th
of "A Handbook of Proverbs." There
polyglot collection by Dr. J. Mapleto
lished anonymously in 1707. Among
English collectors are Camden, Herbert
Prudentum, 1640), Howell, Codrington
and Clark; and Burckhardt prepared "
Proverbs, or the Manners and Custom
Modern Egyptians," illustrated from the
verbial sayings (London, 1830).

PROVERBS, a book of the Old Tes
entitled in the Hebrew original as well
Septuagint and the Vulgate "The Prove
Solomon." This, however, by no mea
cribes the real or final authorship of the
to Solomon, for it is expressly stated in
xxv. that the latter part of the book, be
with that chapter, was written and ad
the previous portion by order of King
kiah. It has, moreover, always been cons
doubtful whether Solomon ever made an
lection of his proverbs in writing. Bu
hardly ever been contested that a large
in the composition of the book may be as
to the wise king, who is said (1 Kings iv
to have uttered 3,000 proverbs, and wh
so celebrated all over the eastern world f
wisdom. The ancient writers of the G
churches frequently gave to this book
name *Sophia* (wisdom).—As regards its
tents, the book is divided into several p
which are distinguished from each othe
separate headings. The first 7 verses o
first chapter may be regarded as a headi
the entire book. Then begins the firs
closing with the end of the 9th chapter.
part does not contain a collection of pro
proper, but rather a series of connected a
nitions in a sententious form. They inc
the love of wisdom, and describe the gl
reward of wisdom and the pernicious c
quences of wickedness. The 2d part, w
extends from chap. x. to xxii. 16, contain
main collection of proverbs and the chief p
of the entire book. The proverbs, about
in number, contain moral precepts and r
of life for every age and every class of me
a clear, sententious form. Generally one p
erb is comprised in one short verse, of 2 me

s or clauses, and 6 or 7 words or phrases.
e 2 members form a parallel opposition to
h other, which is generally carried out even
the single expressions; as for example (x. 1):

A wise son maketh a glad father:
ut a foolish son is the heaviness of his mother.

e grouping together of the proverbs in this
rt appears to have been accidental, except
t occasionally 2 or 3 verses follow each
er which have a characteristic expression in
mmon. With chapter xxii. verse 17, a kind
appendix begins, introduced by a separate
ading. The proverbs of this section gener-
y consist of 2 verses, and sometimes of 3;
y are constructed with less regularity, some-
es containing more than 2 members, and
en without any parallelism. Sometimes
overbs of kindred contents are grouped to-
her. A second appendix to the first collec-
n begins at chapter xxiv. verse 23, and is
arated from the preceding by the heading:
These also are from wise men" (in the com-
n English version: "These things also be-
g to the wise").—The second main collec-
n begins with chapter xxv., which is headed:
These are also proverbs of Solomon, which
men of Hezekiah, king of Judah, copied
t." The proverbs, as in the first collection,
sist generally of one verse each, and each
se of 2 members with parallel opposition.
t exceptions to this rule occur more fre-
ntly than in the first collection. With re-
d to their contents, the proverbs of the sec-
d collection are not so plain and intelligible
those of the first, but more artificial and fre-
ntly even enigmatical. This collection ex-
ds over 5 chapters, and is again followed in
2 last chapters of the book by 3 different
endices.—It is impossible to decide whether
compilation and arrangement of the entire
k were made at one time by one man, or
ether the addition of the several parts took
e at different periods. The advocates of
former opinion adduce in their favor, that
arrangement of the whole seems to rest on
ell conceived and thoroughly executed plan.
either case it is considered probable that the
k received its present form between the time
the death of King Hezekiah and the end of
7th century B. C.—We have valuable com-
ntaries on this book by Salazar (1641),
ultens (1748), Hodgson (1788), Lawson
21), Umbreit (1826), Ewald (in vol. iv. of
Poetische Bücher des Alten Testaments),
ndlaw (2 vols., 1860-'61), and others. Ger-
n translations are added to the commenta-
s of Umbreit and Ewald; a new English
nslation, with Ecclesiastes and Canticles,
been published by the Rev. G. R. Noyes,
D. (Boston, 1846).

ROVIDENCE, a N. co. of R. I., bordered
and E. by Massachusetts and W. by Con-
ticut, and drained by the Blackstone river,
ich runs partly along the E. border, and
Pawtucket, which forms a portion of the S.
ndary; area, 380 sq. m.; pop. in 1860,
107,799. It has an uneven surface and generally fertile soil. The manufacturing interest is very large, and in 1850 there were 99 cotton and 18 woollen factories, and 8 calico printing mills, beside a large number and variety of others. The agricultural productions were 137,070 bushels of Indian corn, 308,879 of potatoes, 10,242 of rye, 32,205 tons of hay, 18,700 lbs. of wool, and 476,843 of butter. There were 13 grist mills, 38 sawing and planing mills, 11 newspaper offices, 101 churches, and 13,370 pupils attending public schools. It is intersected by the Hartford and Providence and Providence and Worcester railroads. Capital, Providence.

PROVIDENCE, a city, the principal port of entry, and semi-capital of Rhode Island, situated at the head of navigation on an arm of Narraganset bay known as Providence river, 35 m. from the ocean, 43 m. S. S. W. from Boston, 173 m. E. from New York, and 396 m. N. W. from Washington; lat. 41° 49′ 22″ N., long. 71° 24′ 48″ W.; pop. in 1730, 3,916; in 1774, 4,321; in 1790, 6,380; in 1800, 7,614; in 1820, 11,745; in 1830, 16,836; in 1840, 23,172; in 1850, 41,513; in 1860, 50,666. In population and wealth Providence is the second city in New England. It covers about 9 sq. m., and is built on both sides of Providence river, which is here crossed by two bridges, one of which is 140 feet in width. Above this, and within the centre of the city, the river expands into a beautiful cove nearly a mile in circuit, along which is built a wall surmounted by an iron railing. A park planted with elms, with gravelled walks, surrounds the cove. Two small streams enter on the N., the Moshassuck and the Woonasquatucket rivers, upon which are many machine shops and manufactories. The land on which the city stands is very irregular. On the E. side a hill rises to the height of 204 feet above tide water. On the W. it is level, with little elevation for a quarter of a mile, when the land rises to the height of 75 feet. The hill sides, even to their summit, are covered with dwelling houses, interspersed with gardens and ornamented with trees. The larger portion of the dwelling houses in the city are of wood; the remainder are of brick and stone, among which are many mansions of great elegance.—There are 3 daily newspapers printed in the city, from which are also issued semi-weekly and weekly papers in addition to 3 others. The first printing press was established here by William Goddard in 1762, from which office the "Providence Gazette" was issued. There are 53 churches, viz.: 14 Baptist, 6 Congregational, 6 Episcopal, 7 Methodist, 1 Moravian, 1 New Jerusalem, 1 Presbyterian, 6 Roman Catholic, 2 Seamen's Bethels, 1 Second Advent, 1 Sons of Israel, 1 Spiritualist, 4 Unitarian, and 2 Universalist. Several of these, built of stone and brick, present fine specimens of architecture. The first Baptist church, which is the oldest in America, was founded here in 1638. Butler hospital for the insane, incorporated in 1844, is situated on the W. bank of Seekonk river, surrounded by extensive grounds, 60 acres of which are under cultivation, with about the same extent of native woodland. The average number of patients is about 150. The edifice was erected and the lands purchased by subscription, Cyrus Butler contributing $40,000, and Nicholas Brown $30,000. Its annual disbursements are about $30,000. The state of Rhode Island makes an annual appropriation of $1,500 to enable the governor to aid poor insane persons there, and it also pays a portion of the expenses of all such poor insane as the town may choose to send. The minimum price of board for patients is $3 per week. Dexter asylum for the poor is situated on the highest land E. of the river. It is a fine edifice of brick, 170 feet long, including wings, and 3 stories high. The grounds, which comprise about 40 acres, are enclosed with a stone wall 10 feet high. The land was given by Knight Dexter, and the buildings erected by the city. The reform school, established in 1850, for juvenile offenders between the ages of 8 and 18, is in the S. W. part of the city. The number of inmates at its last annual report, 1860, was 187, of whom 139 were boys and 48 girls. Its expenses for the year were $14,941.77. The state prison is on the N. side of the cove. At the close of the year 1860 it contained 67 convicts. The county gaol is within the prison walls. The total income of the prison and gaol for 1860 was $16,072.29; total expenses, $13,489. The convicts are almost exclusively employed in cabinet work and shoemaking. Beside these, there are 35 other benevolent and disciplinary institutions.—First in the department of education is Brown university, which in 1860 had 2,043 alumni, of whom 1,256 are now living, and 232 students. A subscription is now (1861) in progress for the erection of a new library building and a laboratory. (See BROWN UNIVERSITY.) The Athenæum, incorporated in 1836, is a handsome granite building. It has a reading room, and a well selected library of 25,601 volumes (June 1, 1861), to which large additions are annually made. The Friends' yearly meeting boarding school, or "Quaker college," occupies a lot of 43 acres in the easterly part of the city. It consists of two spacious brick buildings, 3 stories high with wings of 2 stories. It is liberally endowed and in a prosperous condition. A legacy of $100,000 was bequeathed to it by the late Obadiah Brown. The average number of pupils is about 180, equally divided between boys and girls. The Roman Catholics have two flourishing institutions for educational and charitable purposes. The number of books in the public libraries in the city is 84,930; in Sabbath school libraries, 26,200; in private libraries, 213,725. The schools comprise 4 grades, viz., the high school, grammar, intermediate, and primary schools. The first has an average of 300 pupils with 8 teachers. The 7 grammar schools have 2,050 pupils and 43 teachers. There are 18 in[illegible] diate schools with 38 teachers and 1,9[illegible] and 22 primary schools with 48 teacher[illegible] 8,200 pupils. The whole number admi[illegible] the various public schools during the [illegible] 1860 was 7,852. The cost of this establi[illegible] for the last year was $81,369.04, of wh[illegible] city paid $65,812.97 and the state $10,6[illegible] received from registry tax, $4,955.36. [illegible] Rhode Island historical society, found[illegible] 1822, occupies a fine brick and granite b[illegible] ing opposite the university grounds, erec[illegible] 1844. It contains, beside a valuable libr[illegible] large collection of manuscripts and other [illegible] morials relating to the history of the state [illegible] has published 5 volumes of historical c[illegible] tions.—The arcade, on the W. side, is the [illegible] of the kind in the United States. It ex[illegible] from Westminster to Weybosset street, [illegible] feet in length by 80 in width, a portion [illegible] centre being about 50 feet wider; it is [illegible] high, has 82 shops, and is devoted chi[illegible] the retail trade, dry goods, boots and [illegible] hats, and jewelry being the principal ar[illegible] sold. The building is of granite, with t[illegible] posing Doric porticos, one on each stre[illegible] columns of the porticos are of single blo[illegible] granite. The city has 38 banks, with an [illegible] gate capital on Jan. 1, 1861, of $15,5[illegible] circulation, $2,150,959.75; deposits, $[illegible] 806.68; loans, $19,901,828. There are [illegible] stitutions for savings, which at the c[illegible] 1860 held in deposit $5,011,387, belong[illegible] 19,892 depositors. There are 18 ins[illegible] companies, including stock and mutual co[illegible] nies, and 39 agencies of companies, 37 of [illegible] are from other states and foreign cou[illegible] The railroads terminating at Providence [illegible] the Boston and Providence; Stonington [illegible] Providence (lately extended to Groton); H[illegible] ford, Providence, and Fishkill; Prov[illegible] and Worcester; Providence, Warren, and B[illegible] tol; and Newport and Fall River, now in p[illegible] ress of construction. All the railroads oc[illegible] the same passenger depot, a spacious and [illegible] gant structure of brick nearly 700 feet long[illegible] ated near the heart of the city on the sou[illegible] side of the cove, and near the great bridge [illegible] connects the two portions of the city. Sev[illegible] steamboats ply between Providence and var[illegible] places on Narraganset bay, including Bri[illegible] Newport, Fall River, and Warwick.—[illegible] manufactures of Providence are very exten[illegible] and include cotton, wool, iron, gold, and [illegible] The number of individuals, companies, and [illegible] porations engaged in manufactures to the ex[illegible] tent of $500 or over annually is 596; ca[illegible] employed, $8,426,735; value of raw mat[illegible] used, $7,994,071; value of annual prod[illegible] $17,415,849. There are 6 cotton mi[illegible] woollen mills, 26 iron works, and 7 blea[illegible] and calendering establishments. Among [illegible] manufactories of iron are 8 of screws, all [illegible] ed by the American screw company, which [illegible] a capital of $1,070,000. They use 5,000 t[illegible] of iron a year, of which 4,500 tons are [illegible] rews, the remainder for wire. They make n an average 15,000 gross of screws each day, r 4,620,000 gross a year, and at one of the es- blishments 1,000 gross in an hour, consum- g 3,000 tons of coal a year, and employing om 700 to 1,000 hands. The manufacture of ld and silver ware was commenced in Provi- nce more than a century ago, and now rivals extent and magnitude that of any other lace in the country. A large manufactory as established in 1805. There are 96 estab- lishments in the city for the manufacture of welry. Those for silver are few but large, ne of them manufacturing $500,000 worth an- ually. The number of persons employed is om 1,600 to 2,000, and the annual product ot less than $3,000,000. The city contains 8 factory operatives beside those engaged in e works already mentioned, 952 carpenters, 2 machinists, 364 masons, 305 moulders, 206 acksmiths, 202 boot and shoe makers, 69 cigar akers, 70 cabinet makers, 246 painters and aziers, 96 engravers, 84 engineers, 68 harness akers, 102 printers, 183 weavers, and 224 ilors. The two calico printing establishments roduce annually 1,060,000 pieces or 36,244,000 ards, valued at $2,771,000. In the vicinity f Providence are other print works owned ere, which produce 60,000 pieces of goods a eek. There are 18 furnaces employed in sting machinery, stoves, ploughs, &c., and 10 ops for engraving copper rollers for printing licoes. For the motive power to perform all e work mentioned, there are employed 96 eam engines, with horse power ranging from to 400 each. The aggregate horse power of l these engines is 4,697, used by 227 different stablishments, and employing 8,045 persons. eside these many caloric engines are in use. —During the 6 years from 1856 to 1861 much ttention has been given to vital statistics in rovidence, and the returns of births, mar- ages, and deaths are probably more complete nd perfect at the present time than those of ny other city in America. During the same me special efforts have been made for the revention of disease by sanitary measures. In ddition to this there are some peculiarities f natural location and internal construction hich make the city very healthy. During e year 1860, with a population of 50,666, ere were 1,001 deaths, 523 marriages, and ,648 births; or one birth in 30.74, one person arried in 40.02, and one death in 50,61 of e population. The annual average for 6 ears, 1855 to 1860 inclusive, was one birth in 9.85, one person married in 39.60, and one eath in 50.22 of the population. The colored opulation of Providence shows no increase in e last 20 years. The present number is about ,500.—The valuation of property and taxation Providence for a few years past have been as llows. In 1846: real, $14,676,900; personal, 10,916,300; total, $25,593,200; amount of x, $102,372.80, or 40 cts. on $100. In 1850; al, $17,659,700; personal, $14,126,000; total, $31,959,000; tax, $160,385.85, or 52 cts. on $100. In 1854: real, $33,598,600; personal, $15,330,100; total, $48,928,700; tax, $274,000.72, or 56 cts. on $100. In 1856: real, $36,188,097; personal, $20,108,200; total, $56,296,297; tax, $380,000, or 67½ cts. on $100. In 1860: real, $37,089,800; personal, $21,028,500; total, $58,118,300; tax, $325,462, or 56 cts. on $100. The value of literary, church, and city property not taxed in 1860 was $3,075,228. This valuation is only for property in the city, and does not represent the wealth of the citizens, which may fairly be estimated at $80,000,000, in addition to public property, and property devoted to religious and educational purposes.—During the colonial period of the state, Providence as well as Newport enjoyed an extensive foreign commerce, which has now greatly fallen off, and its commerce is chiefly confined to the coasting trade. The number of vessels which arrived from foreign ports for the year ending Dec. 31, 1860, was 128, tonnage 24,457; number cleared, 111, tonnage 20,267; total number of vessels arrived coastwise, 5,035. The chief articles imported were coal, ivory, dates, gum copal, pig and bar iron, molasses, raw hides and skins, cloves, pepper, lumber, and salt. The chief articles received coastwise were: coal, 342,411 tons; flour, 277,161 barrels; grain, chiefly corn and wheat, 3,387,541 bushels; cotton, 110,846 bales; hay, 2,014 tons; and lumber. The total value of merchandise imported was $375,555. The tonnage of vessels belonging to the district is 19,570.—The city is divided into 7 wards, and is governed by a mayor, 7 aldermen, and 28 common councilmen, elected annually.—Providence was first settled in 1636, by Roger Williams, who was banished from Massachusetts on account of his religious opinions, and who, in his new colony, was the first to propose and establish the principles of universal freedom in religious matters. The rock on the banks of the Seekonk river on which he landed, and where he was received by the Indians, is about a mile from the centre of the city. The town received its first patent from Charles I., bearing date 1643. It suffered much in the famous war of King Philip, in 1675, when a considerable portion of it was burned. It again suffered severely in Sept. 1815, when a south-easterly storm forced an extraordinary tide into the harbor, raising the water 12 feet higher than the usual spring tides, spreading devastation and ruin along the wharfs and the lower part of the town, overturning houses and stores, and doing much damage to the shipping. One large East Indiaman was driven up beyond the cove, from which she could never be removed. Providence received a city charter in 1832.

PROVINCE (Lat. *provincia*), under the ancient Roman state, a territory beyond Italy which had a regular organization under Roman officers. After Rome had extended her conquests beyond the peninsula, the government was divided between Italy and the provinces. The first province was Sicily (241 B. C.), and the second Sardinia (235 B. C.). In Cæsar's time Gallia Ulterior was called simply *Provincia*, whence the more modern Provence, which was included in this region. The mode of settling the government of a conquered country was not uniform; the organization was effected by the military commander, either alone or with the assistance of a commission of senators. The chief administrative officer was at first a prætor, afterward a proprætor; and in the later times of the republic a consul, after completing his term of office at Rome, was appointed to the government of a province with the title of proconsul. His term of office was one year, but it was frequently prolonged. The emperor Augustus made considerable changes in this system, taking upon himself the charge of those provinces where a large military force was required, and committing the rest to the care of the senate and people of Rome; whence originated the distinction, preserved until the 3d century, between the *provinciæ propriæ populi Romani* and the *provinciæ propriæ Cæsaris*. Of the former two were given to the *consulares*, and the rest to those who had filled the office of prætor, and the title of the governor was proconsul or *præses*. The governors of the imperial provinces were styled *legati Cæsaris*, and held office at the emperor's pleasure. Justice was administered according to the laws of the country, to such Roman laws as were specially enacted for the provinces, and to imperial constitutions, particular edicts, and *senatus consulta*, except when, as sometimes happened, the Roman laws were extended to the provinces. A part of the land was confiscated, and sometimes granted on lease to the original possessors. The public revenues were farmed by *publicani*. The governor received no salary, but his position gave him abundant opportunities for extortion, and he also drew from the Roman treasury a sum of money for certain necessary expenses. He alone, as a general rule, enjoyed that high authority denoted by the term *jurisdictio*, which included the right to put persons in possession of property, to nominate guardians for minors, and to appoint judges. All inferior officers acted as his deputies, and this constituted the chief difference between provincial towns and the Italian colonies, as the latter possessed free municipal constitutions, chose their own magistrates, and made their own laws. A grant of the *jus Italicum* to a provincial town placed it upon nearly the same footing as the colonies of the peninsula. With the growth of the imperial power, however, these distinctions were abolished, and the Italian cities lost the most important of their peculiar privileges and were gradually reduced to the condition of the provinces.

PROVINCETOWN, a township and village of Barnstable co., Mass., on the extremity of Cape Cod, 50 m. S. E. from Boston; pop. in 1860, 3,300. It has an excellent harb sufficient depth for the largest vessels. Th habitants are supported chiefly by the fis In 1860 there were 80 vessels with 6 engaged in the whale fishery, and 110 v with 1,100 men in the mackerel and co eries. There were 4 churches (1 Con tional, 2 Methodist, and 1 Universalist), a weekly newspaper.

PROVOOST, **Samuel**, D.D., bishop of Protestant Episcopal church in New Yor in the city of New York, March 11, 174 Sept. 6, 1815. He was graduated at K (now Columbia) college in 1758, went t land in 1761, entered as fellow commo St. Peter's college, Cambridge, and w dained deacon in Feb. 1766, by the bish London, and priest in March, 1766, b bishop of Chester. Having returned to York, he became assistant minister of T church in Dec. 1766. Two years later, in sequence partly of religious and partly o litical differences, he dissolved his conn with Trinity church, and in 1770 retire small farm in Dutchess co., where he re till the close of the revolution, occupying self chiefly in literary and scientific pur Directly after the war the new vestr Trinity church elected him as rector. post he held for nearly 17 years. He chaplain to the continental congress in and to the senate of the United States in and he received the degree of D.D. fro university of Pennsylvania in 1786. H been elected bishop of New York in 1786, he accompanied Dr. William Wh England, and was consecrated with him. 4, 1787, at Lambeth palace, the archbish Canterbury presiding. Bishop Provoo signed on account of his health, in Sept. the rectorship of Trinity church, and in 1801, the episcopal office. The latter re tion, however, was not accepted by the of bishops, and Dr. Benjamin Moore was c to be his coadjutor.

PROVOST (Lat. *præpositus*, placed be Fr. *prévôt*), in Scotland, the chief muni officer of corporate towns, with the same tions as the mayor of English cities; an England the title of the heads of certain leges.—**Provost Marshal** is the title of a tary officer who takes cognizance of o against discipline, and inflicts summary ishment on offenders; and in the navy, o who has the custody of prisoners at a martial, and till the execution of the sent of the court.

PRUDENTIUS, **Aurelius Clemens**, a L Christian poet, born in Spain in 348. He w lawyer, became a civil and criminal judge was appointed to a high military station at c In his later years he devoted himself to reli exercises and study. His extant poems *Præfatio*, written when he was 57 years and giving a catalogue of his works up to time, with a brief and indefinite autobiograp ems, which every thing known in regard to his fe has been learned; *Cathemerinon Liber*, 12 cred hymns, some of which have been inserted in the liturgy of the Roman Catholic church; *potheosis*, maintaining the divinity of Christ, nd the orthodox doctrine of the Trinity; *amartigenia*, on the origin of sin, directed gainst the Marcionites; *Psychomachia*, representing the struggle between virtue and vice in e soul, and the triumph of the former; *Cona Symmachum Liber I.*, an account of the nversion of Rome, with an exposure of the lly of the ancient religion; *Contra Symmahum Liber II.*, a refutation of the argument of ymmachus in his petition to the emperor Valennian; *Peristephanon Liber*, 14 poems in honor f martyred saints; *Diptychon* or *Dittochaeon*, 8 poems in heroic hexameters, 24 describing emarkable events and characters in the Old estament, and 24 describing similar circumances and events in the New, about the uthenticity of which there has been much ontroversy. The only other poem extant is e *Epilogus*. Bentley called Prudentius "the omer and Virgil of the Christians." The arliest dated edition of his works is that of eventer (1472); the best is that of Faustino revalo (2 vols. 4to., Rome, 1788-'9).

PRUD'HON, Pierre Paul, a French painter, orn in Cluny, April 6, 1760, died in Paris, eb. 16, 1823. The 13th son of a mason, who ied while he was a child, he was educated by harity at the convent of his native town, where is taste for art was aroused by the paintings n the chapel; and being recommended to the ishop of Mâcon by his teachers, he was placed y him under the tuition of Devosges, a meritoious artist of Dijon. The young man, having won a prize awarded by the states of Burgundy, went to Rome, where, while studying Raphael, Leonardo da Vinci, and above all Correggio, he ntered into the most friendly relations with he sculptor Canova. In 1789 he returned to rance, where he underwent a long struggle with poverty, and supported himself by occaionally painting miniatures, and making drawngs for concert tickets, bill heads, tradesmen's ards, and confectionery boxes. During the amine of 1794 he paid a visit to Rigny, near Gray, and there executed a series of pastel ortraits for which he received a handsome rice. On his return to Paris he won a prize or an allegorical drawing, representing "Truth escending from Heaven, led by Wisdom." In 1805 he painted on a ceiling in the museum of the Louvre, "Diana imploring Jupiter;" and oon after received from Frochot, then prefect of the Seine, an order for a great picture to adorn the hall of the criminal court: "Justice and Divine Vengeance pursuing Crime." For this masterpiece, which was exhibited in 1808, he received from Napoleon in person the cross of the legion of honor. He was appointed teacher to the empress Maria Louisa, painted the portrait of her child, became a member of the Institute, and had apartments in the Sorbonne. The "Zephyr balancing himself upon the Water," "Innocence seduced by Love," and "Venus and Adonis" belong to this period. In 1819 he exhibited a painting of the Assumption. Two years later his friend and pupil Mlle. Mayer, for whom he entertained a warm affection, put an end to her life, and thenceforth he pined away under the weight of despondency and sorrow. He nevertheless completed "The Indigent Family," the rough draught of which had been left by his unfortunate pupil, and "Christ dying upon the Cross," which was exhibited after his death. His illustrations of *Daphnis et Chloé* and Tasso's *Aminta* are highly valued by artists.

PRUNE. See Plum.

PRUNING, the cutting off superfluous branches from trees, vines, &c., in order to increase their fruitfulness. The practice has also been advantageously extended to shortening the roots of fruit trees, the effect being to check the too rapid growth of the leaves and branches, and divert the nutritious matter in the sap to the production of fruit. In England, on account of the system of training fruit trees to walls, which the peculiarities of the climate render almost necessary for their successful cultivation, the art of pruning has received much more attention, and is carried to far greater perfection, than it demands under the clearer sky of the United States, where fruit trees are cultivated without difficulty as "standards" or in open orchards. Still, when judiciously practised here, unthrifty trees in the nursery and enfeebled orchard trees, by the removal of their weak and crowded branches and of those in the interior of the tree out of the reach of the sun and air, may often be entirely regenerated and restored to the condition of good bearers. But for healthy trees the practice is often worse than useless. The growth of trees is promoted by the supply of sap carried up the inner bark. If this by any reason becomes incompetent to furnish the quantity required for all the branches, and the whole tree consequently languishes, the removal of part of these allows the remaining limbs to receive all the sap, and to assume a rapid and healthy growth. By this healthy action the bark itself is invigorated and the whole tree is benefited. The proper time for this pruning is after the fall of the leaf in the autumn, or during mild days in the winter, provided it be not in a region of very severe winters, as to the N. of lat. 43° N. There it should be deferred till the end of February, but not till the buds begin to swell and the sap to flow. Downing recommends for pruning fruit trees a fortnight before midsummer as by far the best season in the northern and middle states. Wounds made at that time rapidly heal over; and it is the best time for judging of the shape of the tree, and how most easily to improve it. A solution of gum shellac in alcohol is the best composition to apply to the surfaces laid bare in removing large limbs. The fruitfulness of peaches, nectarines, and apricots is increased by the system of pruning called "shortening-in" and "spurring-in," which consists in reducing the young wood by cutting off the small branches and forcing the sap to accumulate in the remainder and thus cause the formation of many bearing shoots. This method Downing regards as especially important for peach trees after they come to bearing, and to the neglect of it he ascribes the fact of the rapid deterioration of peach trees in the United States. It should be done toward the end of February or not much later, and extend to the removal of half the growth (equal to 6 to 12 inches) of the last year over the whole outside of the head of the tree, and also upon the inner branches. For grapes a different and much more thorough system of pruning is advisable, founded on the facts that the vine bears well only when it is young or composed mainly of young wood, and that the shortening or spurring-in method practised with foreign grapes is soon followed by mildew. The best mode is that known as the long or renewal mode, which consists in laying down every year long shoots of the previous year's growth, and as these come to bearing removing entirely the old vine. The branches which form in one year are trained for bearing the next year; and after this they are cut down to the main branch from which they sprung, others in the mean time having come forward to take their place. By judicious pruning and training the vines are kept back so as to produce a moderate amount of fruit the 3d year, and increasing quantities the 4th and 5th years.—Root pruning consists in digging a trench early in November about 18 inches deep around the tree and cutting off the principal roots with a sharp spade. Manure is introduced into the trench, and the trees may thus be made to flourish almost as well in a naturally poor as in a good soil. By this method dwarfed trees may be made plentiful bearers, growing within 6 feet of each other, and the trees, though 15 or 20 years old, may be conveniently taken up at any time and removed to other places. The pruning may be renewed every year, though a cessation for one, two, or three seasons may sometimes be advisable, that the tree may not be too much exhausted.

PRUSA, or PRUSIAS. See BROUSSA.

PRUSSIA (Ger. *Preussen*), one of the six great powers of Europe, consisting of a large portion of northern Germany, the former duchy of Prussia, and part of the former kingdom of Poland. The name was applied until the 18th century only to the former duchy of Prussia on the Baltic and the Vistula, whose inhabitants, a Lithuanian tribe (Porussi, or Borussi, whence the Latin name of the country, Borussia), had been conquered by the Teutonic knights in the 13th century. The rulers of Prussia were formerly styled kings in Prussia, thus expressing that their German possessions were no kingdom; but Frederic the Great, having firmly established his power, assumed the title of king of Prussia. Since then the different provinces ruled over by the Hohenzollern dynasty have come to be considered a consolidated kingdom.—The kingdom of Prussia consists of two distinct territories, beside a few small possessions, wholly enclosed within the territory of neighboring states. The eastern territory, covering an area of 89,287 sq. m., lies between lat. 49° 50′ and 55° 50′ N., and long. 9° 50′ and 22° 50′ E., and includes 6 of the 8 provinces of the kingdom, viz.: Prussia proper, Posen (wrested from Poland), Brandenburg (the original possession in Germany of the Prussian dynasty), Pomerania (partly inherited and partly conquered from Sweden), Silesia (wrested from Austria), and Saxony (partly wrested from the kingdom of Saxony). This territory is bounded N. by the Baltic sea, E. by Russia, S. by Austria, the kingdom of Saxony, and the Saxon duchies, and W. by Hesse-Cassel, Hanover, Brunswick, and Mecklenburg. The western territory, consisting of Westphalia and the Rhenish province, 10,305 sq. m., extends from lat. 49° 10′ to 52° 30′ N., and from long. 5° 50′ to 9° 25′ E., and is bounded N. by the Netherlands and Hanover, E. and S. E. by the principalities of Schaumburg and Lippe, Hanover, Brunswick, Hesse-Cassel, Hesse-Darmstadt, Waldeck, and Nassau, S. by the Palatinate, Hesse-Homburg, and France, and W. by Luxemburg, Belgium, and the Netherlands. A third distinct Prussian territory, consisting of the formerly independent principalities of Hohenzollern (ceded to Prussia in 1850), is enclosed by the kingdom of Würtemberg and the grand duchy of Baden. The entire area of the kingdom is somewhat less than that of the New England states and New York combined; but while these in 1860 had only 7,000,000 inhabitants, Prussia had, by the latest census (1858), 17,740,000, or 164 to the square mile, distributed as follows:

Provinces.	Area in sq. m.	Population.	Proportion to sq. m.
Prussia proper..........	24,926	2,744,500	110
Posen..................	11,262	1,417,155	125
Brandenburg............	15,468	[illegible]	150
Pomerania..............	12,146	[illegible]	109
Silesia................	15,700	3,269,613	208
Saxony.................	9,734	1,910,983	196
Westphalia.............	7,787	1,566,441	201
Rhenish province.......	10,305	3,106,672	301
Hohenzollern...........	440	64,235	146
Jahde navy yard (purchased from Oldenburg in 1854)........	....	800	..
Total............	107,963	17,739,913	164

Of the total population, about 14,300,000 belong to the German race, 2,900,000 to the Slavic, 30,000 to the Celtic (French), 170,000 to the Lithuanian, and 225,000 to the Semitic stock (Jews). The Slavi are principally Poles in the eastern provinces, beside a small number of Moravians and Bohemians in Silesia and Wends in Lusatia. The rural portions of the eastern provinces excepted, German is the common language. The principal cities and

wns are Berlin, the capital of the kingdom;
nigsberg, capital of Prussia proper; Dant-
, Memel, Posen, Stettin, Stralsund, Breslau,
gdeburg, Erfurt, Münster, Cologne, Coblentz,
eves, and Aix la Chapelle.—By far the
rgest portion of the Prussian territory be-
ngs to the great plain of northern Europe.
e eastern provinces form a level district of
er 50,000 sq. m., intersected by a few incon-
derable hill chains, the highest elevations of
hich do not exceed 700 feet. The S. W.
undary of Silesia is formed by the Riesenge-
rge, or Giant mountains (average elevation
400 feet, highest peak 4,929 feet), and their
ntinuations, the Iser ridge and the Lusatian
ountains. The N. part of the province of
xony, which extends from the river Elbe to
e Werra, is almost a perfect level, interrupt-
only by inconsiderable hills and an isolated
evation of 1,086 feet, the Petersberg, near
alle. The S. portion to the S. W. of the
ver Saale is intersected by projecting spurs
the Harts mountains (highest elevation,
e Brocken or Blocksberg, 3,506 feet), and the
uringian forest (highest elevation the Dol-
ar, 3,184 feet). The W. provinces contain the
W. group of the mountain system of Ger-
any, its numerous ridges having as many
stinct names. The more important are: on
e right bank of the Rhine, the Weser hills,
cluding the picturesque gap known under
e name of Porta Westphalica, the Teutoburg
rest (the battle ground of the Germans and
omans), the Rothhaar hills, the Sauerland
lls, the Seven mountains (Siebengebirge), and
esterwald (2,000 feet); on the left bank of
e Rhine, the Hundsrück (3,000 feet), Hohe
een, and Eifel (1,600 feet). The Hohenzollern
incipalities are intersected by the Rauhe Alp.
-The only coast line of Prussia is on the Bal-
c sea, and has a length of 515 m. The sea
ing shallow near the coast, and full of shift-
g sand banks, there are few good harbors;
e best are Stralsund, Colberg, and Dantzic.
eside the open bays of Bodden, Putziger
Wyck, Prorer Wyck, and Tromper Wyck, there
e several extensive lagoons or haffs, separated
om the open sea by narrow strips of land or
rings of islands. Of these lagoons the Great
d Little Haff, whose head is formed by the
nbouchure of the Oder river, the Frisches
aff, which receives the waters of the Nogat
ver, and the Curisches Haff, are the most ex-
nsive. Of lakes Prussia contains an immense
umber, especially in the level N. E. section,
ut none of them are important either for their
tent or as affording facilities for commerce.
he largest lake in the province of Prussia,
irding, covers an area of only 37 sq. m. The
rovince of Saxony contains a small salt lake
the vicinity of Halle, the Röblinger See.
the Rhenish province the Laacher lake, an
ld crater, nearly 8,000 feet square and over
00 feet deep, fed by 40 springs, is renowned
legendary lore. The total number of lakes
vering not less than 200 acres each is 280,
and their total area 750 sq. m., the aggregate area of all other lakes being 700 sq. m. There are large swamps on the lower course of the Havel, Oder, Warta, and Netze rivers, which attempts have long unsuccessfully been made to drain. All the river systems of Prussia belong to the basins of the Baltic and North seas. The principal rivers in the eastern section are the Memel, Vistula (with its tributaries the Drewenz, Ossa, Brahe, and Mottlau), Oder (with its tributaries the Oppa, Ohlau, Bartsch, Bober, Neisse, and Warta), and Elbe (with its tributaries the Saale and Havel with Spree). Independent of these are a number of coast rivers, viz., the Dange, Pregel, Elbing, Leba, Lupow, Stolpe, Wipper, Persante, Rega, Ucker, Ihna, Peene, and Recknitz, nearly all of them navigable for some distance. The western section is watered by parts of the river systems of the Werra, Ems, and Rhine. The Rhine flows through Prussian territory a distance of 185 m., receiving on the right bank 8 tributaries, viz., the Lahn, Wied, Sieg, Wupper, Ruhr, Lippe, Berkel, and Vechte; and on its left bank the Nahe, Moselle, and Ahr. Beside its rivers Prussia has a large number of artificial water courses, the Vistula and Oder being connected by the Bromberg canal, the Oder and Spree by the Müllrose canal, and the Havel and Elbe by the Plane canal. Other canals connect small adjacent river systems in the western provinces.—The climate of Prussia is wholesome and temperate, though an extent of 17 degrees of longitude necessarily produces considerable diversity in the temperature and atmospheric changes. The mean temperature at Königsberg is 42.10° F., at Berlin 46.2°, at Aix la Chapelle 48.87°, and at Cologne and Treves 50°. The soil, though in some mountainous districts of the western section extremely desolate and sterile, and a poor loamy sand in a large division of the middle provinces, is on the whole fertile, and preëminently so in the bottoms of the Elbe, Saale, Unstrut, Oder, Warta, Netze, and other rivers in Pomerania and Silesia. Even where it is naturally poor, a well developed system of agriculture, assiduously fostered by the government, renders it highly productive. Of the total area of the kingdom, 42 per cent. consists of tilled fields, 1.2 gardens, vineyards, and orchards, 7.4 meadows, 7.6 pasture, 18.2 woodland, and 23.6 waste land, lakes, &c. All kinds of grain are produced in abundance in Prussia proper, Posen, Silesia, and Saxony, all of which export breadstuffs to the other provinces or to foreign countries. A full grain crop is estimated at 60,000,000 bushels of wheat, 90,000,000 of rye, 28,000,000 of barley, and 95,000,000 of oats. Of potatoes about 420,000,000 bushels are raised. In 1859 there were 7,764 breweries and 6,541 distilleries, consuming 5,000,000 bushels of grain and 30,000,000 of potatoes. Spelt, peas, rape seed, dye stuffs, herbs, flax, hemp, chicory, hops, and beets are cultivated in large quantities in all parts of Prussia. During the year ending Aug. 31, 1860, 221

beet sugar manufactories produced over 200,000,000 lbs. of sugar from 29,594,342 cwt. of beets. Tobacco enters largely into the agricultural production of western and central Prussia. The tobacco fields cover an aggregare area of 30,000 acres, yielding about 25,000,000 lbs. Of 40,000 acres of vineyards full ¾ are on the Rhine and its tributaries. Their average yield during 27 years was 6,852,895 galls., but in one year (1834) it was as much as 17,494,040 galls. Wine of good quality is produced only near the Rhine; those brands which are produced in Saxony (Naumburg) and Silesia (Grüneberg) are proverbially bad. Fruit culture has been greatly improved in Prussia within the last quarter of a century. The forests, covering an aggregate area of 12,471,388 acres, furnish an abundance of excellent timber and lumber. In the raising of domestic animals the progress of Prussia since its reconstruction after the wars of Napoleon has been more marked than in any other branch of agricultural pursuits. The number of sheep nearly doubled from 1816 to 1849, but the improvement in quality has been still greater than the increase in number. The breed of horses has been so improved by government studs, that not only are all the horses wanted for army purposes obtained within the state, but large numbers are exported to neighboring countries. In 1853 the total number of horses in Prussia was 1,575,000, and of horned cattle 4,372,000. Hogs are bred to a greater extent in Westphalia than in other pr geese in Pomerania, bees in Brand Westphalia, and Lusatia, and goats mountainous districts; poultry is al everywhere. The fisheries on the sh the Baltic and on the lakes and rivers portant, and all kinds of game common tral Europe are found in the forests. are seen only in Prussia proper and where also a few bisons and elks are ca preserved. The lynx, fox, badger, beaver, and otter, and wild fowl are less commonly met with in different pa the kingdom. Seals are sometimes ca the Baltic.—Mining industry advanced astonishing rapidity within the second of the present century, but its further received a check in 1858, from which not yet recovered. In 1852 the total of mines in Prussia was 3,088, viz.: mines, 440 brown coal, 1,615 iron, 153 zinc, 69 copper, 9 vitriol, 5 arsenic, 5 antimony, 5 manganese, 2 cobalt, 1 fluor and 2 graphite, employing 114,832 me 195,930 women and children; of fur rolling mills, &c., 1,183, employing 59,5 and 124,141 women and children; of salt 23, employing 2,275 men and 5,313 and children. The total value of mining ucts in 1856 was $21,582,100; in 1857, $ 725,000; in 1858, $25,125,000; in 185 $ 623,740. The production of the principal erals has been as follows:

Years.	Coal, tons.[*]	Brown coal, tons.	Iron ore, cwt.	Zinc ore, cwt.	Copper ore, cwt.	Lead [illegible] cwt.
1851	22,672,566	10,043,190	18,788,960	3,006,806	968,284	[illegible]
1852	25,788,208	11,761,846	14,045,890	3,620,960	1,243,093	[illegible]
1853	28,688,165	12,200,687	14,965,160	3,246,660	1,255,247	[illegible]
1854	34,014,698	12,365,825	21,938,390	3,578,577	1,244,781	[illegible]
1855	40,789,129	13,774,880	22,282,170	4,287,298	1,278,799	[illegible]
1856	44,288,456	15,556,289	30,681,780	4,532,498	1,431,638	[illegible]
1857	47,388,512	18,244,428	33,811,690	4,377,789	1,308,465	[illegible]
1858	52,086,479	19,889,014	30,786,780	4,887,845	1,833,883	[illegible]
1859	48,604,183	20,849,641	21,425,560	5,565,541	1,427,977	[illegible]

The total value of the products of furnaces, founderies, puddling works, &c., in 1856, was $55,650,000; in 1857, $55,825,000; in 1858, $56,000,000; in 1859, $46,883,123. The q tities produced during the 10 years from 1 to 1859 were:

Years.	Pig iron and castings, cwt.	Iron bars and rails, cwt.	Zinc, cwt.	Lead and litharge, cwt.	Copper, cwt.	Silver, marks[†]
Average 1849-'51	2,578,276	2,540,450	555,364	110,718	23,207	[illegible]
" 1852-'54	4,168,189	4,044,406	723,903	162,573	23,219	[illegible]
1855	5,858,072	4,610,868	765,081	222,810	33,010	[illegible]
1856	7,072,766	5,833,780	766,521	245,719	34,251	[illegible]
1859	7,829,711	5,866,951	1,260,812	304,617	63,927	....

Gold is obtained only in very small quantities, averaging about 30 lbs. a year. Of arsenic the product in 1857 was 4,131 cwt.; of smalt, 1,526 cwt.; of antimony, 227 cwt.; of nickel, 315 cwt. Of salt there was produced, in 1855, 244,136,000 lbs.; in 1856, 254,952,000; in 1857, 302,296,000. Other mineral products of Prussia are agate, amethyst, chrysoprase, alabaster, marble, tophus, millstone, limestone, gypsum, slate, porcelain clay, pipe clay, and marl. Amber, which is fished from the sea or dug from the beach of the Baltic in large quantities, is properly a vegetable product, though so times classed with minerals. Among the m eral springs of Prussia (108) the following joy the widest reputation: Warmbrunn, brunn, Reinerz, and Landeck in Silesia; Fr enwalde in Brandenburg; Lauchstädt in S ony; Driburg in Westphalia; and the sul springs of Aix la Chapelle.—The manufactur industry of Prussia is comparatively of re growth. Up to the beginning of the pres century Prussia was mainly an agricultural military state. Even the efforts of Frede e Great to diversify the occupation of his eople by introducing new branches of manu- acture were in the main unsuccessful, proving hat arbitrary decrees are unable to lead an gricultural people to industrial pursuits while he freedom of labor is restricted by political stitutions. It was only after the ultimate bolition of serfdom (Oct. 9, 1807), the intro- uction of municipal self-government (Nov. 19, 808), and the removal of the mediæval institu- ion of trade guilds (Oct. 28, 1810), that manu- acturing industry began to take root in Prus- ia under the shelter of the prohibitory system ntroduced by Napoleon. After the downfall f Napoleon the Prussian government at first bandoned his commercial policy, but the un- xampled distress created in a large portion of he kingdom by a perfect inundation of cheap nglish goods and the rapid decrease of domes- ic production compelled the government to nact a moderately protective tariff (1818) and o consolidate the industrial interests of a large art of Germany. Since then the industry of russia has steadily and rapidly advanced un- er a commercial policy that, while removing s far as possible all internal restrictions and reating new domestic markets by establishing eciprocal free trade with a majority of the erman states (*Zollverein*), afforded protection gainst foreign opposition to those branches f industry which, from the want of accumu- ated capital, would have been crushed if they ad not been so protected. In 1806 the pop- lation of Prussia was 10,000,000, with an verage income of $10 to each inhabitant; the apital invested in manufacturing establish- ents little exceeded $200,000,000, and the umber of free laborers was 490,000. In 1856 he average income of over 17,000,000 inhab- ants was $43 each, the capital invested in man- factures $770,000,000, and the number of free aborers 2,771,000. It is true that within this eriod the territory of the kingdom has been onsiderably increased; still the fact remains hat with an increase of population of only 70 er cent. the products of labor have increased n value at least 300 per cent. A large share f this increase belongs to the agricultural pro- uction, the progress of which has been stimu- ated by the increase of domestic consumption. he total value of agricultural products was stimated in 1856, by the agricultural depart- ent of the government, at $282,755,560, more han double the amount of the total production f Prussia 50 years ago. In the same year the et income of 363,676 merchants, manufactu- ers, shippers, &c., was estimated at $260,000,- 000; of 2,770,498 free laborers at $80,000,000; f 325,024 tradesmen at $75,000,000; of 116,671 rofessional men at $35,000,000; and of 100,000 aborers at $5,000,000. Extensive branches of anufacturing industry have been created in russia, as it were, from nothing. Among hese the manufacture of beet sugar stands fore- ost. The introduction of the cotton manu- acture has been attended with great hardship. In 1846 the number of spindles was 194,290, which had increased to 289,000 in 1856. Their number at the close of 1857 was estimated by the minister of commerce at little less than 400,000. Since then there has been but little if any increase. The linen manufacture has suffered more than any other branch of industry from British competition. For some time the manufacturers endeavored to undersell the British by reducing wages. The sufferings produced by this proceeding among the weavers of Silesia form one of the darkest episodes in the history of Prussia. The most prosperous departments of mechanical industry are the manufactures of woollen goods, silks, and hardware. While 40 years ago Prussia exported the largest portion of its raw wool, its imports of the raw material and woollen yarns now exceed its exports. The total value of cloths manufactured in the Zollverein in 1852 was $84,000,000, of which nearly $16,000,000 worth was exported. The domestic consumption of cloth, which in 1806 averaged only ⅓ ell to each inhabitant, increased to 1½ ells in 1849, and to 3½ in 1852. Within a period of 10 years (1842 to 1852) the net value of cotton fabrics exported by the Zollverein, exclusive of the cost of raw material, increased from $6,500,000 to $13,000,000. The Rhenish province, Westphalia, and Saxony are the principal seats of the manufacture of textile fabrics. Hardware of all kinds is manufactured in all the provinces except Prussia proper and Posen. The machine shops of Berlin rival the largest establishments of the same kind in England. Solingen and Suhl are celebrated for cutlery and guns; Silesia for castings and sheet iron; Westphalia for scythes and needles. Rapid as the increase of the production of raw iron has been in Prussia, it has not been able to keep pace with the increase of consumption. With a home production of 5,858,072 cwt. of pig iron in 1856, Prussia imported 2,604,465 cwt., making the total consumption 8,462,537 cwt. The imports in 1857 were 4,161,357 cwt., which, added to the home production of nearly 7,500,000 cwt., shows a total consumption in that year of over 11,600,000 cwt., an increase of 3,200,000 cwt. or 40 per cent. in 2 years. The manufacture of leather, morocco, cordovan, &c., flourishes in the province of Saxony, Berlin, and in Prussia proper. In the manufacture of paper the progress has been more rapid even than in textile fabrics; it is carried on in the Rhenish province, Westphalia, Brandenburg, Saxony, and Silesia. Chicory and starch are manufactured principally in the province of Saxony, tobacco in all parts of the kingdom. The most extensive copper and brass manufacturing establishments are found in the province of Saxony and on the Rhine. Glass ware, crockery, stone ware, and china are produced in large quantities, principally in the central and eastern provinces. The porcelain of Berlin rivals the best French china ware. Tassels, fringes, trimmings, &c., are manufactured at Breslau, Magdeburg, Cologne, and Berlin; furniture and pianos at Berlin. In most of these departments of industry the production is fully or nearly equal to the consumption, the imports into Prussia of such goods being balanced by exports to a similar amount. The employment of steam power has increased 1,200 per cent. within 20 years. In 1837 there were in Prussia 423 steam engines, of an aggregate of 7,513 horse power; in 1852, 2,832, of 92,462 horse power; in 1859, 8,878 engines (aggregate horse power not stated, but probably 300,000). Of these there were employed in cotton mills 878, in machine shops and metal manufacturing establishments 1,691, in grist and saw mills 806, in mining 1,498, in navigation 117, on railroads 1,264, and for various other purposes 2,624. The total number was distributed among the different provinces thus: Rhenish Prussia 2,153, Westphalia 1,656, Saxony 1,650, Silesia 1,352, Brandenburg 1,190, Prussia proper 878, Pomerania 298, Posen 201.—With the exception of England, no other country has such excellent postal facilities as Prussia. The number of post offices increased from 1,819 in 1855 to 1,956 in 1857; the aggregate number of miles over which the mails were carried, from 18,880,000 in the former year to 20,250,000 in the latter. The number of letters carried in 1860 was 135,377,086. The drop letter delivery in the large cities of Prussia is the most punctual in the world. In 1857 the number of letters delivered in Berlin was 7,190,693, of which 2,148,410 were drop letters. The single postage is 2½ cts. for any distance under 46 m., 4¾ cts. for any distance from 46 to 92 m., and 7 cts. for any distance above 92 m. The postal establishment is not only self-sustaining, but yields a profit to the government. In 1857 the total receipts were $8,523,578, and the disbursements $7,148,516. The telegraphs all belong to the government. Their aggregate length was 2,616 m. at the close of 1854, 3,650 m. at the close of 1857, and 4,450 on Jan. 1, 1859. From 1854 to 1857 the number of messages increased from 152,820 to 241,545. The limited number of stations renders the telegraph of much less value for commerce than it is in England or America.—On Jan. 1, 1860, there were 22 railroad lines and portions of 7 incomplete lines in operation. The total length of the former was 3,107 m., of which 776 were built on government account at a cost of $48,343,840; of the latter, 276 m. The aggregate cost of the completed lines was $205,991,587, or an average of $66,299 a mile, the average being much lower on the roads built by government. The rolling stock consisted of 1,259 locomotives, 1,975 passenger cars, and 32,794 freight cars. The number of passengers carried over the roads in 1859 was 20,161,218; total freight 241,621,312 cwt. The receipts were $23,586,904, or an average of $7,590 per mile; total expenditure $11,008,468, or an average of $3,543 per mile, leaving interest on the capital at the rate of 6.11 per cent., against 6.56 in 1858. Of gravelled turnpike roads there were under the charge of the state government, Jan. 1, 1858, 8,868 m.; of turnpikes built and maintained on account of districts, corporations, mining companies, &c., 6,561 m. The length of river navigation is 3,631 m., and of canals 443 m. Since railroads have entered into competition with river navigation, the number of river craft has been diminished, while their tonnage has increased and is now nearly 800,000 tons. Steamboats ply on the Rhine, Moselle, Weser, Elbe, Havel, Spree, Peene, Oder, and Vistula. In 1859 there arrived in Cologne, the principal port on the Rhine, 1,124 sailing vessels, carrying 90,690 passengers and 81,639 cwt. of freight, while some 30 steamboats carried 574,495 passengers. The coasting and foreign commerce is carried on from 20 ports on the Baltic, of which Dantzic, Pillau, Elbing, Memel, Stralsund, and Stettin are the most important. The commercial marine, including river steamers, increased from 933 vessels of 278,250 tons in 1854 to 1,326 vessels of 339,442 tons on Jan. 1, 1861, and the number of steamers from 29 to 85 within the same period. Of the total number of vessels, 901 were sea-going sailing craft of 316,200 tons, 340 coasting vessels of 12,978 tons, 24 ocean steamers of 6,780 tons, and 61 river steamers of 3,584 tons. The movements of shipping in 1859 and 1860 were as follows:

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[*] 1 ton = 4 scheffels = 6.236 bushels.

[†] 1 mark = 0.62656 lb. troy.

Years.	Entered.		Cleared.	
	Vessels.	Tonnage.	Vessels.	Tonnage.
1859	9,116	1,471,569	9,197	1,614,[illegible]
1860	11,671	1,884,731	11,868	1,940,944

Of the entrances in 1859, 5,121 vessels were Prussian and 3,995 foreign, and of the clearances 5,188 Prussian and 4,009 foreign; of the entrances in 1860, 5,828 sailing vessels and 727 steamers were Prussian, and 5,806 sailing vessels and 310 steamers foreign, and of the clearances 5,587 sailing vessels and 723 steamers were Prussian, and 5,280 sailing vessels and 309 steamers foreign. Of the tonnage inward in the latter year, 1,617,150 belonged to sailing vessels and 267,582 to steamers, and of the tonnage outward, 1,682,674 to sailing vessels and 258,270 to steamers. Among the arrivals and departures in 1860 there were but 2 vessels from the United States, tonnage 1,562. Distinguishing between vessels with cargoes and vessels in ballast, among the former the Prussian bottoms constituted 56.78 per cent. of the arrivals and 49.83 per cent. of the departures: among the latter 39.77 per cent. of the arrivals and 62.52 per cent. of the departures. Of the vessels cleared from Prussian ports, there were 9,659 loaded and 1,158 only in ballast; of the arrivals, 6,458 loaded and 4,176 in ballast, showing that the export trade of Prussia is much heavier than the import trade. The coasting trade is free to those nations which extend the same privilege to Prussian bottoms. As yet the progress of the shipping interest has been rather irregular in Prussia. The exportation of breadstuffs and lumber from the eastern provinces to England (the average export of the former approached 1,000,000 quarters after the repeal of the British corn laws) has suffered by the competition of the United States and the Danubian countries; and the investment of capital in the shipping business has been very slow, if it has not actually decreased since the admission of foreign bottoms to the coasting trade. The principal marts of the interior commerce are Berlin, Breslau, Magdeburg, Frankfort, Cologne, Elberfeld, and Münster. The principal articles of export are wool and woollen fabrics, breadstuffs, linseed, rape seed and rape seed oil, flax, linen, and cotton goods, wine, lumber, salt, amber, coal, iron, zinc, lead, hardware, dye stuffs, books, leather, and dyed yarn. The imports consist of molasses and sugar, coffee, wine, rum, arrack, tobacco, cotton, raw silk, tea, spices, hops, dye woods, tin, quicksilver, saltpetre, glass, cattle, dried and salt fish, train oil, and furs. The import duties being specific and levied on behalf of the Zollverein, it is difficult to ascertain the value of the foreign commerce of Prussia, nor do the official triennial reports of the minister of commerce contain any general statistics under this head. The last of these reports (1855-'7) gives the following account of the commerce of Stettin:

Years.	Imports, cwt.	Value.	Exports (exclusive of lumber), cwt.	Value.
54	[illegible]	[illegible]	1,213,772	[illegible]
55	4,476,224	12,104,251	[illegible]	[illegible]
56	6,261,370	14,001,417	[illegible]	[illegible]
57	[illegible]	[illegible]	[illegible]	12,791,772

that in this table the average value of goods is estimated at a higher rate in 1856 and 1857 than in the two preceding years.—The banking establishments of Prussia are hampered by government monopolies, and are not in proportion to the wants of commerce. Until 1855 the royal bank at Berlin (which had been transformed into a joint stock bank in 1846) was the only bank of issue. Since then 8 private joint stock banks have been established under a sort of free banking act, which however offers few inducements to capitalists. The note circulation of every private bank is limited to $700,000. The circulation of the royal bank, which until 1850 had not exceeded $15,000,000, rose to $50,000,000 in 1857, but has since decreased. In all the principal cities there are branch establishments of the royal bank. The number of banking establishments not authorized to issue notes increased from 64 in 1854 to 108 in 1857. A peculiar moneyed institution of Prussia, first introduced by Frederic the Great, but since then imitated in other countries, is the real estate bank, originally intended to save the large landholders from the usurious practices of money lenders. These banks issue transferable mortgage bonds to the amount of one half or two thirds of the value of landed estates, the bank or association of landholders guaranteeing the principal and interest to the holders of the bonds. The aggregate amount of such bonds exceeds $100,000,000. The association of capital for commercial and industrial purposes, not including railroads, turnpikes, or canals, has greatly increased within the last decade. From 1852 to 1854 inclusive 45 joint stock companies were formed, representing an aggregate capital of $30,000,000; from 1855 to 1857 inclusive, 75, with an aggregate capital of $45,792,600. Of the latter, 38 (capital $25,792,100) were mining companies, 8 (capital $6,125,000) insurance companies, 16 (capital $8,337,700) manufacturing companies, and 7 (capital $4,900,000) banking companies. Savings banks in Prussia are municipal institutions, doing only local business. Their number in 1859 was 462. The aggregate deposits in them on Jan. 1, 1858, were $28,704,150; 1859, $31,290,517; 1860, $31,696,761. The depositors on Jan. 1, 1860, were 564,986, of whom fewer than one fourth (125,031) held over $70 each.—Public education is better provided for in Prussia than in any other European country, or in fact any other country, some of the New England states excepted. Instruction in the common branches of learning, reading, writing, and arithmetic, is compulsory. In fact, it is difficult in Prussia to find adult persons unable to read. The number of common schools is 24,800, with 31,000 teachers and over 2,500,000 pupils. The number of "middle schools," academies, apprentices' schools, Sunday schools, and industrial schools is very large, and increasing from year to year. Of apprentices' schools (*Handwerker-Fortbildungs-Schulen*) there were in 1859 297, with 23,625 pupils. There were 21 provincial technical schools (*Gewerbe-Schulen*), attended by 1,049 persons. In 1859 there were 84 higher (common) schools (*Bürgerschulen*); 52 colleges for instruction in the exact sciences (*Realschulen*); 129 classical colleges (*gymnasia*), with 1,700 teachers and 30,000 students; 39 preparatory colleges (*progymnasia*), with 190 teachers and 2,000 students; 56 normal schools; 6 universities (at Berlin, Königsberg, Halle, Breslau, Greifswalde, and Bonn); and 2 Roman Catholic theological academies, with over 5,000 students. Beside these there are numerous educational institutions for special branches of science, viz.: theological seminaries connected with the universities; a philosophical academy at Paderborn; 9 Roman Catholic seminaries; 3 seminaries for the higher branches of school teaching; a polytechnic institution and an academy of architecture at Berlin; mining academies at Berlin, Bonn, and Halle; an academy of veterinary surgery at Berlin; an academy of forest culture at Neustadt-Eberswalde; agricultural colleges at Eldena, Proskau, Poppelsdorf, and Möglin, and 25 agricultural schools; schools of horticulture at Potsdam and Schöneberg; academies of surgery at Berlin, Breslau, Greifswalde, Magdeburg, and Münster; 7 military academies; 7 nautical schools; and a great number of private commercial academies. All educational institutions are controlled, more or less directly, by the government. Even private teachers must submit to a thorough examination before they are permitted to open schools. The common schools are sustained and administered by the municipal corporations, but the teachers are appointed by government. Of charitable institutions, there are deaf mute asylums at Berlin, Königsberg, Breslau, Münster, and Cologne; asylums for the blind at Berlin and Breslau; a number of orphan asylums and nurseries, of which Berlin alone has over 40; 95 Bible societies, a missionary society at Berlin, &c. The highest branches of scientific culture are fostered by the royal academy of Berlin, and numerous associations of scholars, philosophical, geographical, historical, medical, legal, and polytechnic societies. There are large public libraries in all the principal cities; observatories and botanical gardens are connected with the universities; a zoological garden is kept near Berlin. The fine arts are taught by the royal academy of art at Berlin, the academy of design at Düsseldorf, 5 provincial academies of design, and an academy of chartography. The number of musical academies and musical societies is enormous. The newspaper press has not yet in Prussia attained to the same prosperity, power, and influence which it enjoys in England and America; but its progress since the revolutionary movements of 1848 has been strongly marked. There is no centralization of the newspaper press, many of the large provincial daily journals being fully equal, or even superior, in importance and circulation to the metropolitan press.—The dominant religion in Prussia is the Protestant. The two principal Protestant denominations (the Lutheran and the Reformed or Calvinistic church) united in 1817, assuming the common designation of Evangelical church. According to the last full census there were in Prussia 10,874,774 Evangelical Christians, 6,832,293 Roman Catholics, 1,485 Greek Catholics, 15,000 Moravians, 20,000 Herrnhuter, and 226,868 Jews. The number of Protestant churches and meeting houses is 9,000, of Roman Catholic churches and chapels 7,250, of Jewish synagogues 900. The people of Posen, Westphalia, and the Rhenish province are almost wholly Roman Catholic. The Evangelical is the established church. It is governed by the supreme ecclesiastical council at Berlin (established in 1850) in all spiritual matters, and by the ministry of public worship in temporal affairs. Each province has a consistory, and is divided into dioceses, at the head of which stand superintendents or bishops. Of such dioceses Prussia proper has 51, Posen 18, Brandenburg 76, Pomerania 56, Silesia 52, Saxony 95, Westphalia 19, and Rhenish Prussia 25. The Roman Catholic church has 2 archbishoprics (Posen and Cologne) and 6 bishoprics (Culm, Ermeland, Breslau, Münster, Paderborn, and Treves). Of the Jews fully one half live in the eastern (formerly Polish) provinces. The members of all chur recognized by government enjoy equal rights. Other denominations (Baptists, M odists, German Catholics, and Free Congre tionalists) are barely tolerated, though the stitution guarantees full religious liber Prussia is a hereditary constitutional mona The constitution promulgated Jan. 31, guarantees to all citizens equality in rights, the right of habeas corpus, reli liberty, freedom of the press, &c. The ki the chief executive, clothed with all pre tives of monarchical power. He admini the government by the advice of 10 respon ministers, viz.: the secretaries of state, royal household, of foreign affairs, of the rior, of public worship, education, and hea commerce, industry, and public works, of tice, of the treasury, of war and the navy of agriculture. The legislature consists house of lords and a chamber of dep To the former belong all princes of the al blood, all princes formerly sovereign now subject to the king of Prussia, hered peers, peers for life, 90 members elect the wealthiest classes, and 30 members el by the municipal corporations of as many p cipal cities. The chamber of deputies co of 352 members, who are elected by rect universal suffrage for a term of 3 y The legislature may originate bills, but king has an absolute veto power. As yet constitution has been of scarcely any pra value. The rights it guarantees have overridden by police regulations, the resp bility of the ministers has remained a dea ter, and the legislature has been power either for good or evil on account of the in gruity of its component elements. At the h of the political administration of each prov stands a chief president. The provinces divided into administrative districts (*Reg ungsbezirke*), governed by presidents; there 25 beside the city of Berlin and the Hoh zollern principalities, each of which forms separate district. The districts are divi into circles (*Kreise*, 337), governed by pref (*Landräthe*). Provincial assemblies exist, b their powers are only advisory. They can originate any measures, and must not even vise the government upon any subject unle called upon to do so. Their principal duty is apportion the taxes to be levied from the pr inces. The police throughout the kingdom administered by the government. The admin tration of justice has been completely reorgan ized since 1848. Publicity of judicial proceed ings, trial by jury, and a new criminal code ha been introduced, and all exceptional jurisdiction has been abolished. In Rhenish Prussia the code Napoleon and the French legal procedure which were introduced under the rule of Na poleon, have been maintained. In the other provinces there are city or district courts, an 22 courts of appeal. The chief tribunal at Berlin is the court of last resort for all parts of the gdom. The finances of Prussia, which under ederic the Great were the admiration of the orld, have greatly suffered in consequence of he wars of Napoleon, and the revolution of 848. The army and navy consume $\frac{1}{4}$ of the tire income of the nation, and within the last 0 years the military expenses have increased om $17,500,000 to $26,950,000, or 54 per cent. he following table shows the state of the russian finances since 1848, the sums being iven in thalers, of 70 cents each:

Years.	Ordinary revenue.	Expenditure, ordinary and extraordinary.	Deficiency.
[illegible]	92,424,291	97,424,291	5,000,000
[illegible]	[illegible]	[illegible]	4,281,189
[illegible]	86,721,860	[illegible]	3,072,672
[illegible]	94,177,[illegible]	96,511,[illegible]	[illegible]
[illegible]	97,559,[illegible]	101,150,[illegible]	[illegible]
[illegible]	[illegible]	107,[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	118,[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	none
[illegible]	[illegible]	[illegible]	none
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

he government owns 740,925 acres of cultiated land, from which it obtains a rental of ver $2,000,000, and 5,109,769 acres of forests, eside mines, salt works, railways, &c. The llowance to the king and royal family, $1,791,-71, is deducted from the income of the state omain, and the remainder goes into the treasry. The revenue is made up by a complicated stem of direct and indirect taxation. Of the tal revenue about $19,000,000 is derived from rect taxation, $25,000,000 from indirect taxaon, $16,000,000 from the post office, the govrnment monopoly on salt, and state lotteries, 7,000,000 from landed estates belonging to govrnment, and $27,000,000 from miscellaneous urces. The exemption of a large number of nded proprietors (noblemen) from taxation real estate renders the taxes more oners than they would be under a fair and equible apportionment. The public debt, which 1787 was only $32,250,000, amounted to 152,491,500 in 1820. During the subsequent riod of peace it decreased to $98,000,000 in 47, but within the next 8 years it again ineased to over $154,000,000, and is now $175,-0,000, exclusive of $17,500,000 debts of the vernment railroads.—The Prussian military ganization is based on the principle that ery citizen owes his services to the country. very Prussian is by law a soldier, though, in nsequence of the limitation of the army to a rtain number of men, all may not be obliged enter the ranks. The regular army consists men from 20 to 25 years of age. Formerly ey had to remain in active service for 2 years ly (with the exception of the royal guards), d were then dismissed to form a reserved regar force liable to be called out at any time r 3 years more. But in 1860 King William, en prince regent, without asking the consent the legislature, increased the regular term active service to 3 years, which is equivalent to an increase of the peace establishment by nearly one third. The term of active service for professional men, students, &c., is one year. Having served his term in the regular army, the Prussian enters the *Landwehr* (militia), which is divided into two levies (*Aufgebote*), the first comprising all men from 26 to 32 years of age, the second all from 33 to 39 years of age. The first levy is called out every year a few weeks for drilling and manœuvring. In war it is employed the same as the regular army. The second levy is liable to be called out in time of war for the purpose of garrisoning the fortresses. All men over 39 and under 60 years of age form the irregular militia (*Landsturm*), which acts as a home guard in case of a foreign invasion. It is only a local force for defensive purposes, never called out except in extreme cases. The regular army is composed as follows: 1. Infantry—*a*, royal guards: 4 regiments of 3 battalions each, 1 reserve regiment of 2 battalions, 1 battalion of sharp shooters, 1 battalion of riflemen; *b*, regiments of the line: 32 regiments of 3 battalions, 9 reserved regiments of 2 battalions, 8 combined reserved battalions, 8 battalions of riflemen. 2. Cavalry—*a*, royal guards: 6 regiments (*garde du corps*, cuirassiers, dragoons, hussars, and uhlans), of 4 companies each; *b*, line: 8 regiments of cuirassiers, 4 of dragoons, 12 of hussars, 8 of uhlans, of 4 companies each. 3. Artillery—*a*, royal guards: 1 regiment of 12 batteries; *b*, line: 8 regiments of 12 batteries each. 4. Pioneers—*a*, royal guards: 2 companies; *b*, line: 8 sections and 1 reserved section, of 2 companies each. The first levy of the landwehr consists of 36 regiments and 8 reserved battalions of infantry (116 battalions), and of 34 regiments and 8 reserved companies (144 companies) of cavalry. The second levy consists of 116 battalions of infantry and 104 companies of cavalry. The artillery belonging to the landwehr has no separate organization, but the men enter the ranks of the regular army whenever it becomes necessary. The army is divided into a corps of guards (head-quarters, Berlin) and 8 army corps (head-quarters, Königsberg, Stettin, Berlin, Magdeburg, Posen, Breslau, Münster, and Coblentz). Each army corps consists of 2 divisions (a division comprises 2 brigades or 4 regiments of infantry, and 1 brigade or 4 regiments of cavalry), 1 regiment of artillery, 1 section of pioneers, 1 battalion of riflemen, 2 reserved regiments, and 1 or 2 companies of veterans. In war, an army corps numbers 25 battalions of infantry (25,000 men), 32 companies of cavalry (4,800), 88 field pieces, 4 reserved battalions, and 6 reserved companies. The total of the Prussian army, according to the new organization of 1861, is, in peace, 212,649, in war, 622,880; while the total number of those who have gone through the military drill and are under 40 years of age is estimated at 855,000 (calculating the decrease by death at 25 per cent.), leaving nearly 230,000 men as a reserved force even after the army has been put upon the war footing. The navy of Prussia is still in its infancy. It consists of 55 vessels, carrying 265 guns. Of this number 42 are gun boats, 4 steamers, 4 corvettes carrying from 10 to 12 guns each, 2 sloops of war carrying 8 guns each, and two transport ships, and one is a frigate of 48 guns.—The country which has given its name to the kingdom of Prussia, of which it is now only a province, was known as early as 320 B. C. by the Phœnicians, who procured amber from the shores of the Baltic sea. The aborigines, a Lithuanian tribe, appear to have been peaceable and quiet, not unacquainted with agriculture, and living under a democratic form of government. During the first centuries of the Christian era, they became dependent upon the Goths, who overran their country. In the 10th century they are first mentioned under the name of Porussi (*po*, behind, people living behind the Russ, a fork of the river Memel). Their religion was polytheism, and human sacrifices were not uncommon among them. Bishop Adalbert, who attempted to convert them to Christianity, was slain by them while hewing down their sacred oak tree, in A. D. 997. Boleslas I., duke of Poland, invaded their country and compelled them to profess the Christian faith in 1015, but neither himself nor his immediate successors could retain a hold upon them. A large army which Boleslas IV. led against the Prussians was totally annihilated, and the Prussians even succeeded for some time in holding a part of Poland in subjection. In 1219 they repelled a crusade sent against them from Germany, and soon became the terror of all neighboring countries. The Teutonic knights finally conquered Prussia (1230–'83), founded cities, introduced German colonists and German laws, and by their firm but liberal rule made Prussia one of the most flourishing countries of its time. But about the middle of the 15th century the demoralization of the knights, their continual wars with Poland and Lithuania, and their reckless exactions created a powerful opposition. The nobility and the municipalities obtained the assistance of the king of Poland, Casimir IV., and by a war of 12 years' duration (1454–'66) compelled the order to cede western Prussia and Ermeland to Poland. The remainder was left to them as a fief of Poland. In 1511 the margrave Albert of Brandenburg was elected grand master of the order. Having vainly striven to throw off the Polish rule, he turned Protestant, and in 1525 accepted Prussia as a duchy from Poland. His son, Albert Frederic, becoming insane, the duchy was governed by his relatives, of whom John Sigismund, elector of Brandenburg, inherited it in 1618. He was a descendant of Frederic of Hohenzollern, burgrave of Nuremberg, who had become possessor of Brandenburg in 1415 by foreclosure of mortgage. It is the electorate of Brandenburg, not Prussia proper, which must be considered the nucleus of the present monarchy of that name. The electorate, though frequently divided by the descendants of Frederic, played a spicuous part in the history of Germa pecially during the reformation. Fred (1415–'40) subdued the robber knights, obtained some additional territory from merania and Mecklenburg, but succumbe the Hussites, who devastated his country fire and sword in 1432. Frederic II. (144 surnamed the Man of Iron, enlarged his sessions by purchases from neighboring but was unfortunate in his attempts to quer Lusatia from Bohemia and Stettin Pomerania. Albert Achilles (1470– John Cicero (1486–'99) contended energet against the usurpations of the lords, an moted industry, commerce, and science. achim I. Nestor (1499–1535) was noted scholar, and also as one of the most violen ponents of the reformation, and a perse of the Jews, of whom he had many at the stake or exiled. Joachim II. (1535–'71) became a Protestant, secula the bishoprics of Brandenburg, Havelber Lebus, founded many educational or char institutions with the proceeds of the property, and concluded a treaty of mutu heritance with the duke of Liegnitz in which became two centuries later the fou tion of the Prussian claims on Silesia. George I. (1571–'98) expelled the Jews wh been readmitted by his predecessor, but in the exiled Protestants from the Nether into his country, and by wise economy gre improved the financial condition of his Joachim Frederic (1598–1608) acquired marriage a claim on the duchy of Pr which his son John Sigismund (1608–'19 manently united to the electorate of Bra burg. Under the reign of George Wi (1619–'40) Brandenburg and Prussia suffe terribly from the 30 years' war. Ha adopted a policy of neutrality, the elector looked upon as an enemy by both conte parties. Prussia was ravaged by Swedes Poles, Brandenburg by the imperial arm the league, and during 12 years by the Swe From the lowest depth of misery and de lation the country was raised by the ene and wisdom of Frederic William, the G Elector (1640–'88). By marking out a vi ous and independent policy against Fra Sweden, and Poland, and shrewdly taking vantage of dissensions among his enemies enlarged his dominions and obtained a pos but little below that of the great powers Europe. Of Prussia he made a sove duchy, severing its connection with Po At his death his possessions had increased 42,320 sq. m. with 1,500,000 inhabitants. son Frederic, the third elector of that na (1688–1713), by consent of the German peror, assumed the title of king in Pru He acquired a few small territories, the pri pality of Neufchâtel in Switzerland among rest. His son Frederic William I. (171 acquired from Sweden a part of Pomerania ith Stettin, increasing the area of the country 46,000 sq. m. He left to his son Frederic II., e Great (1740-'86), $6,000,000 over and above l debts, and an army of 70,000 men, the best isciplined in all Europe. With these means rederic began a war of conquest, and wrested ilesia from Austria. By a wise and prudent dministration he strengthened and consoli ated his kingdom, and elevated it to the rank f a great power by successfully resisting dur g a sanguinary war of 7 years' duration 1756–'63) the combined aggressions of Aus ria, France, and Russia. In 1772 he took art in the first partition of Poland. To his uccessor he left a treasure of $50,000,000, an rmy of 220,000 men, and a territory of 77,000 q. m. On his accession he had 2,240,000 sub ects, and at his death the number exceeded ,000,000. Frederic William II. (1786–'97) ried his best to undo the work of his great redecessor, but failed to destroy the prestige f Prussia, and by participating in the second nd third partitions of Poland added to his ossessions 40,000 sq. m. Frederic William II. (1797-1840), by a weak and vacillating olicy, isolated Prussia and encountered the rath of Napoleon, who, after an ignominious efeat of the Prussian armies in 1806, reduced e kingdom to less than ½ its former area. For years Prussia chafed under the iron hand of apoleon, who did his utmost to reduce the ingdom to its former condition as an unimpor ant margraviate. But during this period the tatesmen of Prussia laid the foundation of its ubsequent greatness by unfettering labor and ommerce, by granting municipal self-govern ent, and basing the military power of the tate upon the people. After the downfall of apoleon most of its former possessions were estored to Prussia, and in addition to them it cquired parts of the kingdom of Saxony and f Pomerania, Berg, Jülich, and several val able territories on the Rhine. The promise f a liberal constitution, given by the king to is people, was not kept. The political condi ion settled down into a sort of patriarchal des otism. The establishment of the Zollverein as the only wise and statesmanlike measure uring 25 years of peace. Frederic William V. (1840-'61), a man of great natural talents nd scholarship, but weak, pusillanimous, and indictive, destroyed almost totally the moral restige of Prussia, and threw away the golden pportunity, offered to him by the revolution f 1848, of becoming the head of a united Ger an nation. For nearly 10 years under his eign the reactionary party of the country ielded a despotic power almost oriental. In 1857 his mental faculties gave way, and his rother William was intrusted with the re ency. Frederic William died Jan. 2, 1861, and as succeeded by the regent as William I., who romised faithfully to execute the constitution, nd was generally credited with a desire of gain restoring Prussia to the political leader hip in Germany.

PRUSSIA PROPER, a great division of the Prussian kingdom, comprising East or Ducal Prussia, and West or Royal Prussia; area, 24,926 sq. m.; pop. in 1858, 2,744,500. East Prussia is bounded N. E. and E. by Russia, S. by Poland, W. by West Prussia, and N. W. by the Baltic. Its surface is low and almost uniformly level, and along the sea coast there are numerous lakes formed by the rivers, the fall being insufficient to carry their waters to the ocean. The most important streams are the Memel or Niemen, which forms a vast estuary or lagoon called the Curische Haff, the Pregel, the Tange, and the Passarge. The greater part of the soil is fertile, and the principal crop is potatoes. Nearly ¼ of the land is covered with forests. Fruit, flax, hemp, tobacco, grain, live stock, fowls, and game are largely produced, and amber is found in considerable quantities. East Prussia comprises the governments of Königsberg and Gumbinnen. Most of the inhabitants are Germans. West Prussia is bounded N. by the Baltic, E. by East Prussia and Poland, S. by Poland, and W. by Brandenburg and Pomerania. The surface, soil, and productions are like those of East Prussia. The principal rivers are the Vistula, whose E. mouth, the Nogat, enters the Frisches Haff, the Drewenz, Sorge, Mottau, Brahe, and Schwarzwasser. There are numerous inland lakes, but they are not so large as those of East Prussia. This division comprises the governments of Dantzic and Marienwerder. The inhabitants are chiefly Poles.

PRUSSIAN BLUE. See POTASSIUM.

PRUSSIC ACID. See HYDROCYANIC ACID.

PRUTH (anc. *Porata*), a river of Europe, which rises in the N. E. Carpathians on the confines of the Hungarian county of Mármaros and Galicia, flows in an E. direction through the latter country and Bukovina, and in a S. S. E. direction along the boundary line of Moldavia and Bessarabia, joining the Danube at Reni, near the delta of the latter river. The affluents of the Pruth are numerous but unimportant. Kolomea, the capital of a circle of the same name in Galicia, and Czernowitz, the capital of Bukovina, are situated on its banks. The Pruth figures conspicuously in the history of the Turko-Russian wars since the times of Peter the Great, who was nearly compelled to surrender on its banks in 1711.

PRUTZ, ROBERT ERNST, a German poet and historian, born in Stettin, May 30, 1816. He was educated at Berlin, Breslau, and Halle, at which last place he became extraordinary professor of literary history in 1849. He has written poems, dramas, romances, and works in literary history and criticism. Of the last the most noteworthy are: *Der Göttinger Dichterbund* (Leipsic, 1841); *Geschichte des Deutschen Journalismus* (vol. i., Hanover, 1845); *Vorlesungen über die Geschichte des Deutschen Theaters* (Berlin, 1847); *Kleine Schriften zur Politik und Literatur* (2 vols., Merseburg, 1847); and *Neue Schriften* (2 vols., Halle, 1854). His principal dramatic works are *Moritz von Sachsen* and *Die politische Wochenstube;* and his best romances, *Das Engelchen* (3 vols., Leipsic, 1851), *Felix* (2 vols., 1851), and *Der Musikanten-Thurm* (3 vols., 1855).

PRYNNE, William, an English author and politician, born at Swainswick, near Bath, in 1600, died in London, Oct. 24, 1669. He was graduated at Oriel college, Oxford, in 1620, studied law, and was admitted a barrister, bencher, and reader of Lincoln's Inn. Having embraced the extreme views of the Puritans, he published several pamphlets against Arminianism. In 1632 he wrote a volume entitled "Histriomastix, the Player's Scourge," in which he attacked theatres, masks at court, dancing, hunting, May poles, cards, and music. Laud, who twice before had endeavored to convict him before the high commission court, took advantage of some passages which appeared to reflect upon the king and queen to bring him before the star chamber, and by that court he was excluded from Lincoln's Inn, and condemned to pay a fine of £5,000, to have his ears cut off, to stand in the pillory at Westminster and Cheapside, and to be imprisoned during the king's pleasure. His work was also ordered to be burned before his eyes by the common hangman. This severe sentence, which was rigorously carried out, did not subdue his spirit, and from his prison he continued to issue tracts against the prelates, calling them, according to Wood, "Luciferian lord bishops, execrable traytors, devouring woolves, with many other odious names not fit to be used by a Christian." The publication of one of these, in 1637, entitled "News from Ipswich," stirred up anew the anger of Laud, and Prynne was again summoned before the star chamber, and fined £5,000. His ears, which had been sewed on, were also again cut off, and the letters S. L. (seditious libeller) were branded on both cheeks. At the execution of this sentence in the palace yard a great crowd was present, which manifested its sympathy with the sufferer; and when he set out for his prison, Caernarvon castle, the road was lined with thousands of spectators, who were anxious for the honor of addressing him. Such numbers also visited the castle, that after a residence of 10 weeks he was removed by an illegal order to the castle of Mont Orgueil in the island of Jersey. There he remained till Nov. 7, 1640, when he was released by an order of the house of commons, his sentence being reversed, and damages to the amount of £5,000 being awarded him against his judges. His entrance into London had the appearance of a triumphal procession. Soon after he became a member of parliament for Newport in Cornwall, and in this position was employed to prepare the evidence against Laud. He took a prominent part in the proceedings of the long parliament, zealously espousing the cause of the Presbyterians, and opposing the Independents; and so little sympathy had he with the extreme measures then adopted, that he was taken into custody just before th king's trial for "denying the supremacy parliament," and on Dec. 6, 1648, was ej from the house. He now became a bitte ponent of Cromwell, and published artic so virulent a character that he was twice prisoned. He was one of the excluded m bers who sat in the house of commons ea 1660, and was so zealous in furthering the toration, that Monk sent for him and adv him to be quiet. After the restoration he appointed keeper of records in the to Wood, in his *Athenæ Oxonienses*, gives a c alogue of his writings, which comprises n 200 volumes. Of these the most valuab his "Collection of Records," "Calendar of P liamentary Writs," and "Observations on Fourth Part of Coke's Institutes." His w are described by Wood as "displaying g industry, but little judgment." His "Rec he intended to bring down as late as the r of Elizabeth, but he lived only long enoug complete the work as far as that of Henry I

PSALMANAZAR, George, the ass name of a French impostor, born about 1 died about 1753. His real name is unkn as also his early history. When first no he had wandered through a great part Europe, and the better to preserve his cognito gave himself out first as a Japan and afterward as a native of the islan Formosa. He travelled over various parts France, Germany, and the Netherlands a soldier, a beggar, a servant; and at l went to England with one Innes, a chapla a Scotch regiment. He now pretended t a convert to Christianity, and Innes obt promotion as the person influential in his c version. In 1704 he published at Londo pretended "History and Description of Island of Formosa, off the Coast of Chin The description of the island was given w such apparent fidelity, the manners and cus were illustrated with so many engravings, copious specimens were given of a new guage and character which bore critical exa nation, that the belief in the story was gen and the learned were divided in opinion the author repented of his evil courses and vealed the imposition. He now applied him seriously to study, and engaged in literary p suits. He wrote a large portion of the "U versal History," a true account as far as kno of Formosa for the "Complete System o Geography," and an "Essay on Miracles," made a version of the Psalms. He left b him in manuscript his own memoirs, wh were published in London in 1765.

PSALMODY (Gr. ψαλμωδια), a general te comprehending the art of writing or comp ing divine hymns or songs, but commonly stricted to metrical versions of the psalms David, to which simple and appropriate a are adapted. The practice of psalm singing Christians may be said to date from the la supper of Christ and his disciples, at the co usion of which they sang "an hymn or psalm" together; and during the apostolical age and for several centuries afterward it was a regular and important part of divine service, the performance being by the choir or the whole body of the church antiphonally. Gradually the part taken by the congregation became restricted, and finally, as a more scientific mode of singing came into vogue, trained performers monopolized the whole of the musical service of the church. At the period of the reformation the old practice was restored by Luther and Calvin, the former of whom may be considered one of the chief founders of modern psalmody, and metrical versions of the psalms were made in various languages. That in French of the first 50 psalms, by Clément Marot, proved exceedingly popular, and psalm singing became a fashionable amusement at the court of Francis I. This version was subsequently completed by Theodore Beza. The melodies were chiefly by Claude Goudimel and Claude de Jeune, native composers; but according to some authorities they were of German origin. Luther himself composed and adapted many psalm tunes, including the well known *Ein' feste Burg ist unser Gott*, versified from the 46th psalm; and his followers favored harmonized part singing, while the more severe Calvinists practised only a simple unaccompanied melody. About the time of Marot's publication appeared the English version of Sternhold and Hopkins, with music, original and selected from the Calvinistic school, and which, quaint and uncouth as it was, continued for many years to be that chiefly in use in England. Subsequently Thomas Ravenscroft, John Playford (called by Sir John Hawkins "the father of modern psalmody"), Dr. Croft, Handel, Dr. Miller, and others made valuable additions to English psalmody; and in 1696 the version of Tate and Brady took the place of that of Sternhold and Hopkins. Within the present century the number of psalm tunes has increased almost beyond calculation.

PSALMS, Book of, one of the canonical books of the Old Testament, containing a copious collection of religious songs. Religious poetry among the Hebrews, as among the oriental nations in general, can be traced to high antiquity. Even the Pentateuch contains several hymns and fragments of hymns, and in the book of Psalms we find one psalm which is ascribed to Moses. In the time of the Judges we meet with the beautiful song of Deborah (Judges v.), and the brief but equally beautiful song of Hannah (1 Sam. ii. 1-10). But the religious poetry of the Hebrews attained the highest degree of development through King David, who is recorded in the Scriptures to have practised it from early youth until his death, and in particular to have introduced the singing of hymns into the service in the tabernacle. In the Hebrew original 73 psalms are ascribed to David, but none of the old ecclesiastic translations, as the Septuagint, the Vulgate, and the Peshito, agrees in this respect. Beside Moses and David, several other authors of psalms are named in the headings; thus, 2 psalms are ascribed to Solomon, 12 to Asaph, 11 to the sons of Korah, a Levitic family, and one each to Heman and Ethan. The Alexandrine and the Syriac versions mention also the prophets Haggai and Zachariah as the authors of some psalms.—The collection of psalms, in the form in which it at present appears in the Old Testament, cannot have been completed until after the captivity, as some of the psalms are obviously of subsequent origin. But particular collections, which were afterward embodied in the book of Psalms, seem to have existed as early as the time of David. The book of Psalms is, according to the analogy of the Pentateuch, divided into 5 books, each of which closes with a doxology. The second book has moreover a postscript, which seems to have been the conclusion of an old particular collection. The Septuagint and the Vulgate, which follows it, differ somewhat from the Hebrew in numbering the psalms, the difference beginning with the 10th and extending to the 147th; the entire number in all these is 150.—The contents of the book of Psalms are manifold. With regard to their object, they may be divided into 6 classes: 1, hymns to God, in which he is praised as the creator, preserver, and governor of the world, and in particular as the protector of his chosen people; 2, national psalms, in which the people are reminded of the ancient history of Israel since the time of the patriarchs, especially of the history of Moses, of the many favors received from God, of the occupation of the promised land, of the signal assistance of God, and of the gratitude therefore due to him; 3, the king's psalms, in which the theocratic king is praised as the representative of Jehovah, and the assistance of the Lord is invoked for him; 4, moral hymns, in which the fate of the pious and the wicked is described; 5, the psalms of lamentation, in which, sometimes by individual Israelites, sometimes by the entire people, misery and calamity, especially oppression experienced from foreign or domestic foes, are lamented, with a prayer to God for deliverance; a subdivision of this class are the penitential psalms, describing the sufferings of the psalmist as deserved, recognizing the committed sin, and praying for pardon; 6, prophetic or Messianic psalms, which have reference to the Messiah and to the extension of his kingdom. There prevails among exegetical writers a great difference of opinion as to the number of psalms belonging to this last class, and theologians of the rationalistic school have even maintained that a directly predictive character cannot be claimed for a single passage in the psalms.—The collection of psalms seems to have come at once into public use at divine service both as prayers and hymns. The singers who were appointed by David for the service of the sanctuary sang psalms, which were without doubt mostly psalms of David. In the time of Hezekiah, psalms of David and Asaph were sung at religious solemnities (2 Chron. xxix. 30), and the same is recorded to have taken place in the second temple after the captivity (Ezra iii. 10). In the Christian church the book of Psalms had likewise from the beginning a great importance. Christ himself, after the celebration of the last supper, sang psalms with his disciples; and soon after, when on the cross, he used the words of a psalm to express his being abandoned by the Father. After his resurrection he expressly declared that the psalms contained prophecies pointing to him. Paul and Silas praised God in psalms in the dungeon at Philippi, and Paul exhorts the Ephesians and Philippians to praise the Lord with psalms and spiritual songs. The early Christians used the psalms both in public service and in their private devotions, and the church soon made them a prominent part of the liturgical books, in particular of the breviary. In the Protestant churches the psalms have always been extensively used for congregational singing, and some denominations, as the Reformed Presbyterian church, do not allow in divine service the use of any other religious hymns.—On account of the significance which has always been attached to the book of Psalms, it has in modern times called forth a larger number of commentaries than any other biblical book. Le Long, in his *Bibliotheca Sacra* (Paris, 1723), enumerates, more than 500 commentaries, exclusive of those which form parts of larger works, as well as of the commentaries on a part of the book of Psalms. Among the English commentaries the work of Bishop Horne has not yet been superseded for popular use, though its critical value is small. The recent literature of England contains no original work of prominence, and a thoroughly good commentary is still felt to be a great desideratum. The recent exegetical literature of Germany is rich in excellent commentaries, among which those by De Wette, Hitzig, Hirzel, Ewald, Hengstenberg, Delitzsch (2 vols., Leipsic, 1860), and Hupfeld (4 vols., Gotha, 1859–'61) are best known. Among recent Roman Catholic commentaries, that by Schegg is particularly valued. In America new translations have been published by Drs. G. R. Noyes and Joseph A. Alexander, the latter with a commentary based on that of Hengstenberg.

PSALTERY, a stringed musical instrument in use among the ancient Jews, and supposed to have been identical with the *nebel* mentioned in the Psalms. Burney says it resembled partly the lyre and partly the harp, but according to other authorities it was in shape a trapezium, not unlike the instrument known as the dulcimer. (See DULCIMER.)

PSEUDOMORPH (Gr. ψευδης, false, and μορφη, form), in mineralogy, a crystal having a form belonging to some other mineral species. In the changes which are ever going on in minerals and rocks, the constituents of crystals are frequently removed and replaced or otherwise altered, and present new combinations without any accompanying change in the original form. This occurs in various ways, as by the displacement of a soluble salt and the subsequent filling of the vacant mould by the introduction of another mineral substance, as in the case of a cubic crystal of common salt in clay, removed by water, and the place afterward filled by gypsum; and again by incrustation of some foreign mineral substance over the original crystal, which may be subsequently dissolved away, leaving the hollow shell empty, or this may be again filled by infiltration of some mineral substance. Such changes are chiefly mechanical; but others are recorded of more decidedly chemical nature, as when interchange of elements goes on *pari passu* when new compounds are produced by the removal or addition of one or more elements. The range in which these changes may occur is so extensive, that there result a multitude of minerals in shapes entirely strange to their composition, and often on this account perplexing to recognize. In general such crystals may be suspected by their lack of lustre and sharp well defined angles of the genuine crystal. Their structure also is [illegible] granular; and if they have any cleavage, this is in quite a different direction from that belonging to the original mineral. Among the great variety of pseudomorphs the following are of frequent occurrence: pyroxene minerals and other silicates converted into steatite; iron pyrites and various other species into hematite; fluor spar and many others into quartz, &c. In geology the common examples of metamorphism may be regarded but as cases of pseudomorphism carried out upon a large scale, and the altered crystals wherever met with possess a new signification as types and evidences of vast changes and processes of the decay and reformation in inorganic nature. The subject was first systematically treated by Haidinger in Brewster's "Edinburgh Journal," vols. ix. and x., and afterward in the work specially devoted to the subject by Dr. J. R. Blum, entitled *Die Pseudomorphosen des Mineral*[illegible] (Stuttgart, 1843). It is also discussed by [illegible] schof and Volger in their works, and elaborate papers upon the subject by Prof. James [illegible] Dana are contained in the "American Journal of Science" (1st series, vol. xlviii., 1845).

PSKOV, or PLESKOV, a W. government of European Russia, bounded N. by St. Petersburg, N. E. by Novgorod, E. by Tver, S. E. by Smolensk, S. and S. W. by Vitebsk, and W. by Livonia; area, 16,588 sq. m.; pop. in 1856, 696,9[illegible] The most important towns are Pskov and T[illegible]ropetz. The Valdai hills traverse the S. E. part, but the surface is generally level. There are several lakes, the most important of which, Lake Pskov, or the southern part of Lake Peipus, comes within the limits of the province on the N. W. frontier; and in the S. E. there are numerous marshes. A great part of the country covered with forests. The principal crops ed are rye, oats, barley, and pulse. Hemp flax are cultivated. The only manufacture any importance is leather, and the inhabi- ts excel greatly in dressing skins. The pop- tion is chiefly of Russian origin, but there a few of other races, including some Moham- dans. In 1854 the government contained village schools, attended by 806 pupils.—ov, the capital, is situated on the left bank he Velikaia, about 5 m. from its mouth in e Pskov, and 165 m. S. S. W. from St. Peters- g; pop. 19,842. It is enclosed by a wall in circuit, and the Kremlin, or citadel, ds in the centre. There are a cathedral about 50 other churches, several of which in a ruinous condition, 3 convents, several ols, and some charitable institutions. Pskov ery conspicuous in the early history of Rus- It has been often besieged; in 1614 Gus- s Adolphus was obliged to retire from re its walls.

SYCHE (Gr. ψυχή, breath, or the soul), a racter of Greek romance, generally accepted personification of the human soul. Her y is thus told by Apuleius. A certain king 3 daughters, of whom the youngest, ed Psyche, was a marvel of beauty, and rs were consecrated to her that properly nged to Venus. The anger of that goddess excited, and she commanded her son Cu- to inspire Psyche with a passion for some itful monster; but he himself fell in love her, and bore her away to a delightful e, where she was visited every night by young god, who left her at dawn. Her ers persuaded her that he who came to her y night, and whom she had never seen, t be some loathsome creature, and urged to destroy him while he slept; but when brought a lamp and beheld his beauty, her deprived her of the power of motion, and le she stood a drop of hot oil falling from lamp upon his shoulder awoke him. With w words of reproach he fled. Psyche now eavored to destroy herself, but nothing in ure would injure her. At length, through contrivance of Venus, she fell under the ence of a sleep brought especially from infernal world. From this sleep she was aroused until Cupid came and touched her h the point of one of his arrows, when she e, and, being now sufficiently purified ugh suffering, was united to her beloved Love himself.

SYCHOLOGY. See PHILOSOPHY.

TARMIGAN, the popular name of the gal- naceous birds of the grouse family embraced he genus *lagopus* (Briss.), which differ from ordinary grouse in having the legs feather- o the claws, giving somewhat the appear- e of a hare's foot (whence the generic name, λαγώς, a hare, and πούς, foot), in the trun- d tail about ⅔ as long as the wings and of o 18 feathers, in most of the species becom- white in winter, and in the nasal groove being densely clothed with feathers; the family characters have been given under GROUSE. There are 6 or 8 species described, inhabiting the northern and snow-covered regions of both hemispheres, being one of the few genera characteristic of the arctic fauna; they are as much at home in snow as are the web-footed birds in water, and their plumed feet enable them to run over its surface without sinking in. They live in families during most of the year, and are monogamous; the females incubate, but the males assist in rearing and feeding the young; the males have a loud harsh cry, and the females cackle like a hen. They are rapid fliers and without a whirring noise, and swift runners; they feed upon berries, buds, mosses and lichens, and even insects; their flesh is good, and their pursuit affords an exciting sport; they are very shy, but when started are easily shot on account of their regular flight. The summer plumage is varied with brown, black, and gray, most of the wing remaining white; in the males the mottling is finer and the colors brighter. It is very difficult to ascertain the exact number of species, from the rarity of specimens in summer plumage, and the absence of accurate determination of sex.—There are 3 well ascertained species in America. The white ptarmigan or willow grouse (*L. albus*, Aud.) is about 15½ inches long and 24½ inches in alar extent; the bill is black, very stout and convex, and broad at tip; the general plumage in summer is rufous or orange chestnut on the head and neck; feathers of back black, closely barred with yellowish brown and chestnut; most of wings and lower parts white; tail brownish black; in winter white, with black tail; no black stripe through the eye. It occurs in the northern parts of America, and is common in eastern Labrador, Newfoundland, and the Hudson's bay territory, and in rare instances in the northern United States; it is found in open rocky grounds and among dwarf willows and birches. In winter they scratch in the snow down to the mosses and lichens on which they feed, collecting often in considerable flocks; in winter the flesh is dry, but is tender and with an agreeable aromatic flavor in summer. They breed in Labrador about the beginning of June, placing the nest under the creeping branches of low firs; the eggs are from 6 to 14, of a fawn color or rufous ground with irregular spots of reddish brown; only one brood is raised in a season. The rock ptarmigan (*L. rupestris*, Leach) is 14½ inches long; the bill is slender, rather compressed at tip; in summer the feathers of the back are black banded with yellowish brown and tipped with white; in winter white, with the tail black (the 4 middle feathers white), and the male with a black bar from the bill through the eyes. It occurs in arctic America, rarely coming further south than lat. 62° N. in the interior, but to 58° on Hudson's bay, and in the Rocky mountains, according to Richardson, in 55°; the same species is said to occur in the northern parts of the eastern hemisphere;

the eggs are pale reddish brown, with darker spots, and are 1⅝ by 1¼ inches. The white-tailed ptarmigan (*L. leucurus*, Swains.) has a slender bill, the plumage in summer blackish brown barred with brownish yellow, and in winter entirely white; it is 13 inches long and 21 in alar extent; it is found in the N. W. portions of America, and to the south along the Rocky mountains to lat 39°.—The common European ptarmigan (*L. mutus*, Leach) is about 15 inches long; the bill is black, short, and robust; the summer plumage is ashy brown mottled with darker spots and barred with orange yellow and dark brown on the sides of the neck and back, and the tail, with the exception of the 2 middle feathers, grayish white with a narrow terminal white band. It is fond of lofty and northern regions, going as far as Greenland and coming down to the highlands of Scotland; when pursued, like the other species, it is apt to dive under the soft snow; it sometimes does this for protection from the cold, and in damp weather is sometimes imprisoned and destroyed under the frozen surface of the snow; the ruffed grouse has the same habit. A species much resembling this, if not identical with it, occurs in America, in the neighborhood of Baffin's bay, and has been described by Audubon as *L. Americanus*.—The Scotch ptarmigan or moorcock (*L. Scoticus*, Steph.) seems peculiar to Great Britain, and is abundant in the hilly districts of Scotland; the general color is chestnut brown, with black spots on the back and undulating black lines below; the winter plumage is the same. It is much esteemed as game, being to the fowler what the fox is to the hunter or the salmon to the angler; where not much pursued it is not very shy, but its plumage is so like the surrounding dark moss and heaths, that it is almost impossible to discover it without the aid of a pointer; it feeds upon heath tops and mountain berries.

PTERICHTHYS, a remarkable fossil fish. See GANOIDS.

PTERODACTYL (*pterodactylus*, Cuv.; Gr. πτερον, wing, and δακτυλος, finger), a remarkable genus of fossil flying reptiles, possessing essentially the characters of saurians, with some only apparent relations to bats and birds. They have been divided into 3 genera according to the number of joints in the wing-bearing finger and the disposition of the teeth; all are characteristic of the secondary epoch, being found principally in the lithographic schists of Solenhofen, and in the oolite, lias, wealden, and chalk of Europe. In the genus *pterodactylus* the jaws had teeth even to the extremity; the skull was elongated, with the intermaxillaries large; nasal opening wide and near the middle of the muzzle, partly closed in front by a small bone as in the monitors, and with a surrounding circle of small bones and a small opening into the orbit as in birds; the lower jaw, as in crocodiles, had no coronary process, and was articulated behind the eyes; the teeth, 5 to 17 on each side, were conical, slightly arched, compressed, inserted in separate cavities, and lowed at the base; neck of 7 stout verte dorsals 13 to 15, and, with the ribs, we lumbar 2 or 3, sacral 6, anchylosed toge and caudal 10 to 15; the shoulder blade coracoid bone separate and weak; sca arch and pelvis as in lizards, except the last seems to have had marsupial bones, ac ing to Pictet; the long bones hollow and air openings, as in birds; humerus short stout, and forearm twice as long; hind slender, with 5 moderate toes of the length; 5 or 6 bones in the wrist, 5 me pals, 5 fingers, with respectively 1, 2, 3, 4 4 joints; the first 4 short and with h nails, the external very long, equal to the and body, and nailless; the gape of very large. This singular animal was ref to the swimming birds by Blumenbach, a the bats by Sömmering, and was determin be a reptile by Cuvier. The nearly equ conical teeth, very small cranial cavity, ent number of joints in the fingers, and ian shape of sternum and scapula, show t was not a bat-like mammal; the very exis of teeth, the small number of the verteb the neck, the thinness of the ribs and tail an absence of recurrent processes in the latte form of the sternum and number of the fin prove that it was not a bird. These chara place it among reptiles, but it had also a m fication of the anterior extremities in the of wings, which are not possessed by an isting or any other fossil members of the the so called wings of the dragon being me membranous expansions from the sides of body supported by the ribs. The form of wings is also remarkable and unique; in the fingers are very little separated, and as a basis for the plumes; in bats the membrane is stretched upon the 4 elong fingers, the thumb remaining rudiment but in the pterodactyl the external finger is greatly developed and supports the membrane, the other 4 having the usual dimensions; the membrane extended prob from the long finger along the sides of the to the hind limbs and beyond, including tail. About 20 species are described, vary in alar extent from a few inches to 4 or 5 ya they probably flew and crept about in the manner of bats; the form of the teeth and stren of the jaws indicate a carnivorous animal of feeble powers; the smaller species must h been insectivorous, and the largest may ha seized fish or small reptiles of their own other genera. The great size of the eyes in cates nocturnal habits; the posterior lim were so far developed that they could doubtl assume an erect position like birds, and pe on trees; the claws of the fore and hind would also enable them to climb along rocks; the body was probably more or le scaly, as in lizards. From the weakness of scapular arch some have doubted the power active flight in the pterodactyl, believing

e wing membranes could only support it in
e air when leaping from place to place, in a
tle more perfect manner than in the dragons;
ut it must be remembered that the atmosphere
the secondary geological age contained more
rbon and less oxygen than at present, and
at in a dense medium, approaching more
arly the physical properties of water, even a
ld-blooded reptile might rise on the wing,
d fly heavily through the thicker air, with
e necessary expenditure of much less muscular
ergy than is now requisite for aërial locomo-
on.—The most anciently known species is the
. longirostris (Oken), about the size of a
oodcock, with a length of 10 inches and an
ar extent of 21; the teeth were $\frac{11}{11}$ on each
de. The *P. crassirostris* (Goldf.), with a
rger head and shorter neck, was a foot long
nd 3 feet in alar extent, and the teeth [illegible]. The
. brevirostris (Cuv.) had a shorter muzzle, the
ead resembling more that of a goose just
atched than of a reptile; the teeth were very
mall, [illegible]; the total length was less than 8 inches,
nd there were only 4 posterior toes. Other
pecies were less than 2 inches long, while on
e contrary the *P. ornis* (Giebel) of the wealden
as 2 feet in length; in the chalk of Maidstone,
ngland, Mr. Bowerbank detected bones of a
pecies which he named *P. giganteus*, 6 to 7
et in alar extent; the *P. Cuvieri* (Bowerb.)
believed to have spread 16½ feet.—The genus
amphorhynchus (H. de Meyer) or *ornithocepha-*
s (Sömm.) was separated for a few species of
e Jurassic age, having the anterior portion of
e jaws without teeth, and probably with a
orny beak; the scapula and coracoid were
nsolidated together, and the tail long and stiff,
ith about 30 vertebræ; there were 4 joints in
e wing finger; the largest species was about
8 inches long. In the genus *ornithopterus* (H.
e Meyer) there were only 2 joints in the wing
nger.—It will be seen from the above descrip-
ion that the pterodactyl was most unlike any
hing now living, and presented a union of
range and seemingly incompatible characters,
aralleled only in the uncouth and impossible
reations of Chinese imagination.

PTOLEMAIS. See Acre, St. Jean d'.

PTOLEMY I. (Ptolemæus), surnamed Soter,
on of Lagus, founder of the Græco-Egyptian
ynasty, born near the court of Philip of Mace-
on in 367 B. C., died in Alexandria in 283.
He was one of the generals of Alexander the
reat, and rendered important services to that
onqueror in his Asiatic campaigns. In the
ivision of the empire which followed Alex-
nder's death, in 323, he became ruler of Egypt,
hich remained nominally a satrapy of Mace-
on under the regency of Perdiccas. Hasten-
ng to Alexandria, he put to death Cleomenes,
lexander's satrap, on the pretext of his being
partisan of Perdiccas. This gave him pos-
ession of a large sum of money which Cleo-
menes had extorted from the Egyptians, and
ith this treasure he equipped an army and
ook Cyrene. To oppose the ambitious schemes
of Perdiccas, he leagued in 321 with Antigonus, Antipater, and Craterus. Perdiccas invaded Egypt, but penetrated no further than the Nile, where Ptolemy had so strongly fortified himself that he foiled Perdiccas in every attempt to cross. On hearing of the assassination of his rival by his mutinous soldiers, he sent wine and provisions to the invading army, and so won them by his courtesy that they unanimously offered him the regency, but he declined it. The next year he seized upon Phœnicia and Cœle-Syria. It was probably during this expedition that he took possession of Jerusalem without opposition by attacking it on the sabbath day. To resist Antigonus, who had now become the most powerful of Alexander's successors, he formed a coalition in 316 with Seleucus, Cassander, and Lysimachus; and after a vehement struggle of 4 years, during which he lost Phœnicia, a hollow peace was concluded (311). The next year Ptolemy renewed hostilities under the pretext that Antigonus had violated the treaty by keeping his garrisons in the Greek cities of Asia Minor and the adjacent islands, and in the course of the long war which followed he lost Cyprus by his defeat in the memorable sea fight near Salamis in 306. Antigonus, elated by this great victory, assumed the title of king, and Ptolemy followed his example. Demetrius, the son of Antigonus and conqueror of Salamis, now invaded Egypt, but, baffled at the banks of the Nile, turned his arms against Rhodes, which had refused to join in the attack. Ptolemy however enabled it to hold out by furnishing repeated supplies of troops and provisions, and out of gratitude for their preservation the Rhodians paid him divine honors, saluting him with the title of saviour (Soter). The death of Antigonus at the battle of Ipsus in 301 terminated the war, and added Syria and Palestine to Ptolemy's dominions; and in 295 Cyprus was again and finally brought under Egyptian sway. The rest of his reign was peaceful. He took wise and vigorous measures to promote the happiness of his Egyptian subjects, revived their ancient religious and political constitution, restored to the priestly caste some of its former privileges, and fixed his capital at Memphis. To the Jews also and the Greeks the same toleration was shown, and great numbers of them were attracted to Alexandria by Ptolemy's enlightened and peaceful policy. He created literary institutions which reached their greatest splendor under his successor, Philadelphus. The most celebrated of these were a library and a museum, a kind of university whose professors and teachers were supported at the public expense. Ptolemy cultivated letters as well as patronized them, and wrote a history of the wars of Alexander, which was praised. He wished his youngest son Philadelphus, the offspring of his favorite wife Berenice, to succeed him, to the exclusion of his older son by his former wife Eurydice. This exciting violent opposition at court, he consummated his purpose by

a voluntary abdication in favor of Philadelphus in 285. He continued however to exercise sovereignty until his death.

PTOLEMY II., surnamed PHILADELPHUS (lover of his brother), king of Egypt, youngest son of the preceding by Berenice, born in the island of Cos in 309 B. C., died in Alexandria in 247. His father caused his accession in 285 to be celebrated with great pomp. He had grown up in a period of public peace and tranquillity, had been carefully educated in elegant learning, and came to the throne thoroughly imbued with his father's enlightened policy. He cleared upper Egypt of robbers, and penetrated Ethiopia on scientific explorations and ostrich and elephant hunts, establishing traffic with the barbarous tribes. Southern Africa also he opened to the enterprise of the Alexandrian merchants. To command the Red sea he founded Arsinoë (near Suez), and connected it with Alexandria by restoring and completing the canal begun by Necho. Lower down he constructed the ports of Myos-Hormos and Berenice, and connected the latter with Coptos on the Nile by an artificial road 258 miles long across the desert. This road continued for ages the route of merchandise from the east and south to Alexandria. Philadelphus was most celebrated as a munificent patron of learning. Under his care the institutions his father had founded attained the highest prosperity. (See ALEXANDRIAN LIBRARY.) The museum included botanical and zoological gardens, and the study of natural history was prosecuted with great ardor and success. This study he further fostered by establishing menageries of wild and rare animals. He sent agents through Greece for the collection of works of art, and made large additions to the literary treasures of the library. He spent vast sums of money on public works, built the celebrated lighthouse on the island of Pharos, and erected a magnificent royal mausoleum to which he removed the remains of Alexander from their resting place at Memphis. The most distinguished poets, philosophers, mathematicians, and astronomers of that time adorned his capital. For the use of the Alexandrian Jews, the Septuagint version of the Hebrew Scriptures is said to have been made by his command. The quiet of his reign was early disturbed by the revolt of his half brother Magas, viceroy of Cyrene, who succeeded in maintaining his independence; and by a contest for the possession of Phœnicia and Cœle-Syria, which was kept up at intervals to near the close of his life, when these provinces at last remained in his possession. He took part at different times in the affairs of Greece, maintaining an unfriendly attitude toward Macedon, and established relations of amity with the rising republic of Rome. He founded a gymnasium at Athens, and planted numerous colonies in various parts of his foreign dominions, which comprised Phœnicia, Cœle-Syria, Palestine, Cyprus, Lycia, Caria, the Cyclades, and portions of Ethiopia, Arabia, and Libya. The effeminacy of the court increasing with the wealth of the country, and being himself of delicate constitution, he came at length to lead the indolent life of a refined voluptuary. Military discipline was neglected, though the number of his war ships was immense. Repudiating his first wife, he married his sister Arsinoë, which the Egyptian law allowed, but she brought him no children. Another stain on his memory is the execution of two of his brothers, in derision for which his surname is said by some to have been bestowed upon him.

PTOLEMY III., surnamed EUERGETES, eldest son and successor of the preceding, by Arsinoë, daughter of Lysimachus, died in 222 B. C. On coming to the throne he found in the public treasury an immense amount of money, and at his command a vast army and navy. His warlike ardor was roused by the ill treatment and subsequent murder of his sister Berenice, wife of Antiochus Theos, king of Syria. With a large army he ravaged Syria and the eastern provinces, advancing as far as Susa, and, without establishing his authority in any new possessions, brought back immense booty in gold and silver, among which were the Egyptian idols which Cambyses had carried off to Persia. This conduct the Egyptians esteemed so meritorious that they called him Euergetes (benefactor). In right of his wife Berenice, daughter of Magas, Cyrene was united to his hereditary dominions, and he made large acquisitions of territory in Arabia and Abyssinia. He inherited the religious liberality and love of learning of his progenitors, and was like his father a proficient in letters. He enlarged the museum, entertained men of learning at his court, and fostered trade, so that under him Alexandria continued her career of unexampled prosperity. The wealth of the empire is shown by the magnificent presents he bestowed upon the Rhodians when their city was destroyed by an earthquake toward the close of his reign. It is commonly reported that he was murdered by his son and successor Ptolemy Philopator, though Polybius asserts that he died a natural death.

PTOLEMY, CLAUDIUS, an Egyptian mathematician, astronomer, and geographer, said to have been born in Pelusium, flourished at Alexandria in the reigns of Hadrian and Antoninus. Scarcely any particulars of his life are known. He handed down to posterity, in the Μεγάλη Συνταξις, or "Great Construction" (of the heavens), the only record we have of the astronomical observations and theories of the ancients who dwelt around the Mediterranean. The most important part of this work is a catalogue of stars, the oldest extant, which is doubtless that constructed by Hipparchus, reduced by Ptolemy to the first year of the reign of Antoninus Pius (A. D. 138). The work treats of the relations of the earth and heavens; the effect of position upon the earth; the theory of the sun and moon, without which that of the stars can-

t be undertaken; the sphere of the fixed stars,
d the determination of the planetary orbits.
olemy adopted the system which places the
rth in the centre of the universe. This theo-
y known by his name, was universally receiv-
till the time of Copernicus. During all that
terval, the history of astronomy presents
arcely any thing more than comments on his
ritings. But for the Arabians the *Syntaxis*
ould doubtless have perished. It was trans-
ted by them, and handed down under the
tle of *Almagest*, in the reign of the caliph Al-
amoun (about 827), son of Haroun al Rashid.
tolemy left a very copious account of the
anner in which Hipparchus established the
ain parts of his theories, and in most of the
anches of the subject gave additional exact-
ss to what that astronomer had done. He
omputed, notwithstanding the fundamental
rors and the inaccuracies of his system, the
lipses of the next 6 centuries; determined the
anetary orbits; and discovered the moon's
econd inequality or evection. As a geometer he
as been ranked as certainly the fourth among
e ancients, after Euclid, Apollonius, and Ar-
himedes. In physics he made an important
dvance. He experimented with a ray of light,
ausing it to pass through media of unequal
ensity, and thus discovered refraction, and has
ccordingly been regarded as the founder of an
mportant branch of the science of optics. He
rst recognized the alteration of the apparent
osition of a heavenly body which is due to this
ause. Ptolemy wrote a universal geography,
hich Humboldt describes as a "colossal" pro-
uction; and the same authority speaks of his
eographical information as surpassing that of
trabo. He was the first to use the terms lati-
ude and longitude, by which he laid down the
osition of each country and town. He proved
he earth to be a globe, and calculated its in-
abited parts to extend from the meridian of
Thinæ, long. 119° 30' E. of Alexandria, to the
eridian of the Islands of the Blessed, 60° 30'
W.; and from the parallel of Meroë, about lat.
16° 30' N., to that of Thule (Iceland or the
Shetland islands), 63° N. After him no one
attempted for many centuries to reform geog-
raphy except in the improvement of details,
and his great work continued to be the stand-
ard text book till the 16th century. He was
distinguished also as a musician, and wrote
treatises on music, mechanics, chronology, and
astrology.

PUBERTY, the period of youth character-
ized by the acquirement of functional power in
the reproductive apparatus of both sexes; its ac-
tivity, however, cannot be called into exercise
until the growth of the individual is completed,
on penalty of premature and permanent ex-
haustion of the vital powers, and the develop-
ment of any latent disposition to disease. That
puberty is not the period of completed growth
is shown by the increase in stature after its
attainment, the subsequent ossification of the
vertebral spinous and transverse processes, and
the consolidation of the pelvic, sacral, and coccygeal vertebræ, sternal pieces, and epiphyses of the ribs, scapula, clavicle, and bones of the extremities. In the human male puberty is established between the 14th and 16th years; beside the increased sexual and muscular development, the beard makes its appearance, the larynx enlarges, giving a lower, harsher, and stronger tone to the voice, and the thoughts, desires, and actions have a more manly character. In the female this period is arrived at between the 12th and 16th years in temperate climates, and somewhat earlier in the tropics and in the midst of the luxury and excitements of city life; there is a similar development in the reproductive system, usually coincident with the appearance of the catamenia and mammary enlargement, and a deposition of fat over the whole surface of the body, causing plumpness and roundness. In the male there is at this time no special tendency to disease, nor in the healthy female; but, as a consequence of the defective physical training of most female youth, disorders of the menstrual function are very apt to occur, with numerous functional, nervous, and even organic complications; in persons of naturally weak constitutions, of both sexes, and in those enfeebled by premature exercise of the mental, physical, or generative powers, the tuberculous diathesis is frequently developed in the lungs soon after puberty.

PUBLICOLA, Publius Valerius, a Roman general and lawgiver, who flourished at the beginning of the republic. His original name was Publius Valerius. According to the common story, he was present when Lucretia stabbed herself, and bore a prominent part in the expulsion of the Tarquins, and after the compulsory resignation of Collatinus was elected consul in his place. In the war between the Tarquins and Veientes and the Romans, he gained a victory over the former in 509 B. C. Returning to Rome, he began building a house on the Velian hill overlooking the forum, which excited fear in the people that he was seeking to raise himself to royal power. When Valerius discovered the existence of these suspicions, he ordered the building to be demolished, and his lictors when they appeared before the people to lower their fasces; whence he received the surname of Publicola or Poplicola, "the people's friend." He now brought forward laws for the establishment of the republic, one of which declared that whoever attempted to make himself king might be killed by any one; another that plebeians condemned by a magistrate should have the right of appeal to the people. He was afterward thrice elected consul; and the expedition of Porsena is placed during his time of office. In 504 he and his colleague, T. Lucretius Tricipitinus, routed the Sabines and returned to Rome in triumph. The annalists usually placed his death in the next year, although Niebuhr thinks that in the original legend he perished at the battle of the lake Regillus in 495 or 496 B. C.

PUBLIUS SYRUS, a Latin comic poet, who flourished at Rome about 42 B. C. He was a native of Syria, and was brought to Rome as a slave; but his sprightliness and wit excited the admiration of his master, who had him well instructed and gave him his freedom. Previous to Publius the mime had consisted to a greater extent of grimace and gesture, and was nearer to what is now known as pantomime; but he interspersed it with proverbial sayings and moral sentences. It is said by St. Jerome that a collection of moral sentences from the farces of Publius was a school book at Rome.

PUCHTA, Wolfgang Heinrich, a German jurist, born in Mährendorf near Erlangen, Aug. 8, 1769, died in the latter city, March 6, 1845. He was originally an advocate, and, after having been employed in various civil offices, was in 1811 made director of the general court of justice in Erlangen. He wrote a large number of works on legal subjects, and in 1842 embodied the results of his experience in a work entitled *Erinnerungen aus dem Leben und Wirken eines alten Beamten*.—**Georg Friedrich**, son of the preceding, born in Cadolzburg, Franconia, Aug. 31, 1798, died Jan. 8, 1846. He was educated at Erlangen, and from 1820 to 1842 was successively teacher in that city, Munich, Marburg, and Leipsic. In the latter year he went to Berlin as Savigny's successor, and was there made member of the state council, and of the legislative commission. His writings are chiefly expositions of the Roman and the canon law.

PÜCKLER-MUSKAU, Hermann Ludwig Heinrich, prince of, a German traveller and author, born at Muskau, Saxony, Oct. 30, 1785. He studied law at Leipsic from 1800 until 1803; entered the king of Saxony's body guard, joined the Russian army in 1813, and served as aide-de-camp to Prince Augustus of Saxe-Weimar; distinguished himself in the Netherlands, was made lieutenant-colonel and military governor of Bruges, and in 1822 was created a prince by the king of Prussia. He travelled in France and England in 1828, in the north of Asia and in Africa in 1835, and subsequently in Italy and the other countries of Europe. He has published various books of a lively and entertaining character; among them his letters from England, translated under the title, "The Tour of a German Prince" (3 vols., London, 1831), excited much attention from its familiar pictures and revelations of aristocratic life.

PUDDLING. See Iron Manufacture, vol. ix. p. 604.

PUEBLA, La, or La Puebla de los Angeles, a S. state of the Mexican confederation, bounded N. and E. by Vera Cruz, S. by Oajaca and Guerrero, and W. by Mexico; area, 8,581 sq. m.; pop. in 1857, 655,622. The drainage belongs partly to the gulf of Mexico and partly to the Pacific, but there are no large rivers. The state is intersected from N. W. to S. E. by the Cordillera of Anahuac, of which Popocatepetl, a volcanic mountain, 17,716 feet above the sea, is the highest point in North America. The most valuable mineral productions are silver and marble. The general elevation of the surface is about 6,000 feet, and a great deal of the soil is fertile, producing abundant crops of different kinds of grain, fruit, cotton, sugar, &c. The principal manufactures are glass, soap, iron, steel, and earthenware; and there is some trade carried on both with the coast of the gulf of Mexico and that of the Pacific, as well as with other parts of Mexico. Many remarkable remains of ancient Mexican civilization are found in this state.—PUEBLA, the capital, is situated 7,881 feet above the sea, 76 m. E. S. E. from Mexico; pop. 75,000. The streets are well laid out, with many fine squares. There are 72 religious edifices. The interior of the cathedral, which forms one side of the principal square, is rich in gold and silver ornaments, paintings, statues, &c. Several of the other churches are handsome buildings, and are also richly decorated. There are numerous convents, colleges, academies, charity schools for both boys and girls, hospitals, and other benevolent institutions. The bishop's palace has a library with a tolerably extensive collection of Spanish and French books. Many of the inhabitants are wealthy, but the people generally are said to be the most demoralized in Mexico. The city is well supplied with water by a small stream on its E. side, and the climate is particularly mild and agreeable. The manufactures include glass, earthenware, soap, sword blades, and coarse woollen cloth; some trade is carried on, and the market is well supplied with all kinds of provisions except fish. Puebla is the second city in the Mexican confederation.

PUEBLO INDIANS, the name applied to several tribes of semi-civilized Indians within the limits of New Mexico, so called by the Spaniards from their living in *pueblos* or villages. They have many characteristics in common which distinguish them from the nomadic tribes, as well as from that most degraded family known as the Digger Indians, who live upon roots, seeds, fish, reptiles, and such other food as they can secure without labor. The Pueblo Indians cultivate the soil, raising generally maize, wheat, and other cereals, vegetables and fruits, and in a few instances cotton. They also raise considerable herds of cattle, mules, horses, goats, and sheep. They spin and weave cotton and wool, and make heavy blankets, sometimes of a superior texture resembling the *serapés* of the Mexicans, and commanding from $30 to $50 each when sold to the Americans. They also make a superior kind of pottery, of various colors, and generally ornamented with geometrical figures. They live invariably in communities and towns. Their houses are sometimes built of stone laid in mortar made of mud, but more generally of sun-dried brick, or *adobe*, the common building material of northern Mexico. These buildings are generally arge, of several stories, and contain many families. In some of the pueblos the whole community, amounting to from 300 to 700 souls, are domiciled in one of these huge structures. The houses are sometimes built in the form of a hollow square; at other times they are constructed on the brow of a high bluff, or mountain terrace, difficult of approach. The first or lower story is invariably without doors or other openings, entrance to the house being effected by ladders. Each upper story recedes a few feet from that below it, leaving a terrace or walk around or along the whole extent of the structure, from which ladders lead to those above. The upper stories have doors and windows, but no stairways. In most instances a single family occupies one apartment, and as its number increases another apartment is added when there is sufficient space, or it is built above and reached by a ladder. In this way these structures sometimes reach 5 or 6 stories in height. This mode was practised by these Indians 3 centuries ago, when the country was first visited by the Spaniards. In every village there is at least one large room, sufficiently capacious to contain several hundred persons, in which they hold their councils and have their dances. These dances are of various kinds, and are more or less connected with their superstitions. Among those strictly so are the dances of the turtle, of good fortune, and one called *cachina* which is usually practised in the winter. The second they dance at their festivals before certain idols which they call the gods of fortune. The superstitious rites connected with their wars are peculiar. Whenever an enemy is killed, they cut off his long hair, drink his blood, and bedaub their faces and garments with it. They then wet their hands with it, particularly the right one, until they are thoroughly soaked, in the belief that by this practice they will increase their strength and raise their animal spirits. To complete the ceremony, they place the scalp of the enemy in the hands of the one who first took it, whom they call the *matador*, or killer. This man is ever afterward regarded with great distinction, even though he may not have been present when the prisoner's life was taken.—The following table of the names and population of the Pueblo Indians is from the return of the census of 1851:

Taos	361	Acoma	350
Picuris	222	Jemez	365
San Juan	568	Isleta	751
Santa Clara	279	Sandia	241
San Ildefonso	139	Cia	124
Pojuaque	48	Santa Ana	399
Tesuque	119	[illegible]	[illegible]
Nambe	111	San Felipe	411
Zuñi	1,294	Santo Domingo	666
Laguna	749	Cochiti	254

Total 7,867

The 7 villages of the Moquis (estimate of Dr. Ten Broeck in 1852) 5,000

To these may be added the Pimos and Coco-maricopas of the Gila, whose numbers may be estimated at .. 4,000

Total of Pueblo and agricultural Indians 16,867

The last two are not usually classed among the Pueblo Indians, although they are rather allied to them than to the nomadic Apaches, the warlike Navajoes, or the numerous tribes living on and near the Colorado. (See COCO-MARICOPAS, and PIMOS.)—The languages of the various Pueblo Indians are not sufficiently known and have not been compared with the care necessary to form an opinion as to the families to which they severally belong; it is safe, however, to say that several of them bear so close an affinity with each other as to render it certain that they are derived from the same stock. Living isolated as they do, and having but little communication with each other, their languages slowly change, and the lapse of a few generations without any intercourse would make them appear as different tribes. If among civilized nations changes are produced from such causes, how much greater must they be among rude and uncultivated people who have no written language.—The civilization which belongs to the Pueblo Indians was not introduced among them by Europeans. They practised agriculture and the arts of spinning and weaving, as well as the manufacture of pottery, when first visited by the Spaniards in the middle of the 16th century. With their rude implements they dug irrigating canals and ditches. The earliest accounts of these semi-civilized Indians were given by Alvar Nunez, who, in his remarkable journey from Florida to the shores of the Pacific, between the years 1529 and 1536, visited them. He was followed in 1539 by the friar Marco de Niza, and in 1540 by Coronado, both of whom explored the country N. and S. of the river Gila, and visited many of the Indian towns. Fernando Alarcon in the same year succeeded in pushing his way up the gulf of California, and thence far up the Colorado river. These early explorers have left us full accounts of what they saw, which admit of no doubt that they visited the very tribes now known as the Pueblo Indians. De Niza describes Cevola as a "great city, inhabited with great store of people, and having many streets and market places. In some parts of this city," he continues, "are certain very great houses of five stories high, wherein the chief of the city assemble themselves at certain days of the year. The houses are of lime and stone. . . . . The people are somewhat white; they wear apparel, and lie in beds; their weapons are bows; they have emeralds and other jewels, although they esteem none so much as turquoises. . . . . Their apparel is of cotton and of ox hides, and this is their most commendable and honorable apparel." Coronado's journey was far more extensive than that of De Niza. He speaks of Cibola, which he visited, as containing "excellent good houses of three or four stories high, wherein are good lodgings and fair chambers, with ladders instead of stairs, and certain cellars under the ground very good and paved, which are made for winter; the ladders which they have for their houses are all in a manner movable and portable, which are taken away and set down when they please." This city of Cibola or Cevola was visited some 50 years later by Espejo, who states that it was also called Zuñi. This place is still in existence, and occupied by one of the most intelligent tribes of Pueblo Indians that remain. Coronado also speaks of several towns to the N. W., which were doubtless what are known as the 7 Moqui towns. Other towns, people, and localities are also mentioned which have been identified by recent explorers. Alarçon, in his voyage up the Colorado, found the Indians exceedingly numerous, having an abundance of maize, beans, and gourds. Their garments, their manners and customs, their large and high houses of stone, their agriculture, &c., all go to show that the civilization and arts which now attract so much attention existed 300 years ago, and had doubtless been known to their ancestors for generations before. The turquoises and emeralds mentioned by all the old Spanish travellers as being found among these Indians are supposed to have been a kind of bright blue and green stones, numbers of which are still found in the region of the Pueblos, and particularly when digging among the ruins of their early structures. It is probable that some of the settlements of the tribes visited by Coronado and other early explorers have been abandoned. Certain it is that many have changed their places of abode or become extinct, as numerous remains exist in various parts of New Mexico, some of which are far more extensive and exhibit a higher state of art than any of the existing habitations of this people. The whole valley of the Gila for 80 miles above the villages of the Pimo Indians bears traces that it was once occupied by a people who cultivated the soil by means of irrigating canals, who constructed large dwellings of adobe, and who made a superior kind of pottery. In this district is an edifice of adobe, originally 3 stories high, with very solid walls, which is still in good preservation. This building was abandoned and in a ruinous condition 3 centuries ago, when the Spaniards penetrated the country, while the plain for miles around is strewn with fragments of pottery and stone grinders similar to those used by the present tribes of Indians. Round heaps in all directions show that the population was probably large. In the valley of the Salinas, N. of the Gila, are similar remains, with evidences of an extensive artificial irrigation at a remote period. The same people seem to have extended themselves southward about 200 miles into the state of Chihuahua, as the numerous remains known as Casas Grandes, near a modern town and on a river of the same name, sufficiently prove. But except at this place, there are no remains of the Pueblo Indians south of the valley of the river Gila.

PUERTO BELLO, or Porto Bello, a seaport town of New Granada, situated on the N. side of the isthmus of Panama, 40 m. N. N. W. from Panama. It stands on the side and at the foot of a ridge of hills which almost surrounds the harbor, and consists of a principal street extending along the shore, which is crossed by several others. The population is inconsiderable, and consists chiefly of negroes and mulattoes with a few white families. The fine harbor of Puerto Bello was discovered by Columbus in 1502, and the town was founded in 1584; but though it for some time rivalled Panama, the unhealthy nature of the climate has caused it to be almost deserted. It was formerly strongly fortified. The British took Puerto Bello from the Spaniards in 1739.

PUERTO CABALLOS, a fine natural harbor on the N. coast of Honduras, in lat. 15° 49′ N., long. 87° 57′ W., and the northern or Atlantic terminus of the proposed Honduras interoceanic railway. The harbor is 9 m. in circumference, with a depth of from 4 to 12 fathoms. Connected with it is a large salt water lagoon, called Alvarado lagoon, 2 m. long by 1 m. broad, and with an average depth of 3 fathoms. Puerto Caballos was selected by Cortes as the principal port for New Spain, and he founded a town there called Natividad. For nearly 3 centuries it was the principal establishment on the coast, but was finally abandoned during the irruption of the buccaneers for the more defensible position of Omoa, 6 m. W. The Carib towns of Tulian and Cieniguita are situated on the S. shore of the harbor.

PUERTO DE LA MAR. See Cobija.

PUERTO PRINCIPE, Santa Maria de, an inland city of Cuba, capital of the department of the same name, situated between two small rivers near the centre of the island, 325 m. S. by E. from Havana, and 45 m. W. S. W. from Las Nuevitas, its port, with which it is connected by railroad; pop. 26,648. It is a place of considerable trade, the exports being chiefly sugar and tobacco, and the imports different kinds of manufactured goods. It was formerly the seat of the supreme court for all the Spanish colonies in America.

PUFENDORF, Samuel, a German publicist, born near Chemnitz, Saxony, Jan. 8, 1632, died in Berlin, Oct. 26, 1694. He was the son of a Lutheran clergyman, and was educated for the ministry at Grimma and the university of Leipsic. In 1656 he repaired to Jena, and under the influence of Erhard Weigel, whose system of teaching mathematics and philosophy was then attracting attention in Germany, he devoted himself to those studies, and also to that of the law of nature. Upon quitting Jena he was advised by his brother Isaac, who was in the employment of Oxenstiern, the prime minister of Sweden, to enter the foreign diplomatic service, and as the first step toward this object he became tutor to the son of the Swedish ambassador at Copenhagen. Being detained with the ambassador's family in Copenhagen in consequence of a war between Denmark and Sweden, he employed his leisure in preparing a work on general law, in which the principles of Grotius, Hobbes, and other jurists were combined with observations of his own. This was published in Holland in 1660 under the title of *Elementa Jurisprudentiæ Universalis*, and, notwithstanding its harsh and repulsive style, attracted great attention from the original views which it embodied. It was dedicated to the elector palatine, Charles Louis, who, in consideration of the merit of the work as well as of the compliment paid him, founded at the university of Heidelberg a professorship of the law of nature and of nations, and placed Pufendorf in the chair, and also intrusted him with the education of his son. His lectures were attended by numbers from all parts of Germany, and the university, previously in a languishing condition, recovered during his residence much of its ancient prestige. The constitution of the Germanic empire formed the next subject of his investigations, and in his *Severini a Monzambano, De Statu Imperii Germanici*, published at Geneva in 1667, he showed that the Germanic system was an incongruous assemblage of discordant parts, and the parent of many social and political abuses. At the same time he pointed out practical remedies for the evils enumerated. The work was translated into the chief languages of Europe, but excited much hostile criticism in Germany, particularly in Austria, where it was placed upon the *Index Expurgatorius* and ordered to be burned by the hangman. Pufendorf defended the work, without acknowledging the authorship, but found his position so uncomfortable, in consequence of the acrimonious controversy in which he became involved with German publicists, that in 1670 he gladly accepted from Charles XI. of Sweden the professorship of the law of nations at the university of Lund. Two years later he published there the work on which his reputation now rests, the treatise in 8 books *De Jure Naturæ et Gentium* ("On the Law of Nature and Nations"), of which he subsequently prepared an abridgment with some variations, entitled *De Officio Hominis et Civis Libri duo* ("On the Duties of a Man and a Citizen"). It presents a careful digest of the law of nature, and in its statement of principles corresponds closely with the work of Grotius *De Jure Belli et Pacis*. In arrangement, however, the two treatises differ essentially, Pufendorf considering first the law of nature, and afterward that of nations, while Grotius inverts this natural order of treating the subject. Recent writers, as Wheaton and Mackintosh, rate very low Pufendorf's original contributions to the science of international law, praising chiefly his industry and research; but his reputation was greatly enhanced by this treatise, and on the invitation of the king of Sweden he removed to Stockholm, and was appointed councillor of state and royal historiographer. In the latter capacity he published his *Commentarii de Rebus Suecicis ab Expeditione Gustavi Adolphi usque ad Abdicationem Christinæ* (Utrecht, 1686), a work of no great value, notwithstanding the copious materials placed at his disposal. In 1688 he accepted a similar office at the court of Frederick William, elector of Brandenburg, the history of whose reign he published under the title of *Commentarii de Rebus Gestis Frederici Wilhelmi Magni, Electoris Brandenburgici*, which is even less creditable to him than the last mentioned work. Of his great treatise, first printed in German at Leyden in 1672, and afterward at Frankfort much augmented in 1684, the best edition is that published at Leipsic *cum Notis Variorum a Gottl. Mascovio* (2 vols. 4to., 1744). The French translation by J. Barbeyrac (2 vols. 4to., Amsterdam, 1712), with original notes, is the version most esteemed. There is an English version by Basil Kennet, with Barbeyrac's preface and notes translated by Carew (London, 1749). Pufendorf also wrote a number of other works of a public or controversial character, most of which are forgotten.

PUFF BIRD, an appropriate name for the *bucconinæ*, an American sub-family of diurnal fissirostral birds, placed by Gray in the kingfisher family, but by the older and some modern writers in the scansorial family of barbets or *capitoninæ*; the generic name *bucco* is applied by Cuvier to the latter.—In the typical genus *bucco* (Linn.), as recognized by Gray, the bill is long, strong, elevated, and very broad at the base, where it is furnished with tufts of strong bristles, and suddenly curved at the tip, which is hooked; the gape very wide; nostrils concealed by the projecting plumes and bristles; wings moderate and rounded, the 1st quill short and the 4th the longest; tail long, broad, even, rounded on the sides; tarsi shorter than the middle toe, strong, and covered in front with transverse scales; toes 2 before and 2 behind, the outer anterior the longest, and the claws long and acute. There are about a dozen species described, in tropical South America; the name is derived from their habit of puffing out the plumage of the head, which gives them a heavy and ill-balanced appearance. They are solitary, silent, and melancholy-looking birds, living generally in retired woods, perching on some low and thickly leaved branch, with the large head drawn between the shoulders; thus they remain for hours at a time, occasionally darting after beetles and other insects, returning to the same perch, which they are said to frequent for months together; they sometimes climb like woodpeckers, supported by the tail, in search of insects in the bark; the nest is made in the hollows of trees; they are not shy, and sometimes select spots near human habitations; their colors are sombre, very different from those of the barbets with which some authors have classed them. The collared puff bird (*B. collaris*, Lath.) is 7½ inches long; rufous above, striated with black; whitish on the chest, terminated by a broad black band; a similar band across the shoulders; abdomen rufous white; bill 1¼ inches and horn-colored. The pied puff bird (*B. macrorhynchus*, Gmel.)

is black, with a black and larger bill; general color black, with forehead, throat, abdomen, and tip of tail white. The spotted puff bird (*B. tamatias*, Gmel.) is reddish brown, lighter below spotted with black; forehead and throat light rufous; black stripe from bill to nape, and white nuchal band. These species are from Cayenne and other parts of Guiana.—In the genus *monasa* (Vieill.) the bill is shorter, strong and hooked, with the culmen more curved and the sides more compressed; 4th and 5th quills equal and longest; tail very long, broad, and rounded. There are about half a dozen species in tropical America, with habits similar to the last. The wax-billed puff bird (*M. atra*, Bodd) is 11½ inches long; bill 1½, orange yellow; head, neck, and upper parts greenish black; some white on the wing coverts; breast and belly cinereous; a short horny spine at bend of wing. The white-bearded puff bird (*M. leucops*, Licht.) is general blackish lead color, with the bill red and its base surrounded by a band of whitish feathers. The striped puff bird (*M. fusca*, Gmel.) is about 7 inches long, of a dark brown color, striped on the head, sides of neck, and back with light rufous; below rufous white; upper breast white, bounded by a narrow semicircle of black. These species are from Cayenne.—In the genus *chelidoptera* (Gould) the bill is shorter than the head, with base broad and elevated, culmen curved as in the cuckoos, and tip sharp; wings reaching nearly to end of tail, 3d and 4th quills equal and longest; tail very short and even, and tarsi very short. Gray describes a single species, the swallow puff bird (*C. tenebrosa*, Gould), about 7 inches long, of a blackish color, with a black bill; rump white, and lower part of abdomen light rufous. It is a bird of powerful flight, resorting to the topmost branches of trees, whence it darts in pursuit of insects.—Figures of many of these puff birds may be found in Swainson's "Birds of Brazil and Mexico" (London, 1841).

PUFFIN, a web-footed bird. See AUK.

PUGATCHEFF, YEMELYAN, a Cossack chieftain and pretender to the throne of Russia, born in Simoveisk on the Don in 1726, executed in Moscow, June 10, 1775. He first appears as the leader of a band of disciplined robbers. In the 7 years' war he served first in the Prussian and then in the Austrian army, and subsequently in the Russian war against Turkey. Returning to his native land, he was imprisoned for seditious conduct; but having recovered his liberty, he went to Yaitzkoi, where a resemblance noticed between himself and Peter III. prompted him to pass himself off as the murdered monarch, to forge a tale about his escape from death, and to declare that he was now to set about the task of regaining his throne. The insurrection broke out in the middle of 1773, when a manifesto of Pugatcheff in the name of Peter III. was published. At first he had only a few hundred men, but after he had got possession of the fortress of Yaitzkoi, and the religious sect of the Raskolniks had embraced his cause, the peasantry went over to his [illegible] in large numbers. With these he took numerous fortresses on the Ural, the Volga, and [illegible] Don, when his army increased to a most alarming extent, numerous Tartar and Finnish [illegible] also taking up arms for him. He now marched upon Moscow, but his courage failed [illegible] critical moment, and he was betrayed and [illegible] by his comrades for 100,000 rubles to M[illegible]son and Suwaroff. The lives of 100,000 [illegible] were lost in this insurrection.

PUGET, PIERRE, a French sculptor, pa[illegible] architect, and ship builder, born in Mars[illegible] Oct. 31, 1622, died Dec. 2, 1694. He was [illegible]prenticed to a ship builder and wood ca[illegible] travelled on foot to Italy, and after s[illegible] great hardships obtained admission to th[illegible]dio of Pietro di Cortona, a painter in R[illegible] Returning to Marseilles in 1643, he soon f[illegible] employment, and was commissioned by [illegible] duke de Brézé to design a magnificent [illegible] which, in honor of the queen, Anne of A[illegible] was called La Reine. This splendid spe[illegible] of naval architecture, decorated with car[illegible] by Puget, was completed after 3 years of [illegible]mitting labor. Puget now returned to [illegible] and during a stay of nearly 7 years his [illegible] for architecture became paramount. In [illegible] he was at home again, and painted many ch[illegible] pictures for Marseilles, Aix, Toulon, Cuers [illegible] La Ciotat. A serious illness obliging h[illegible] give up painting in 1655, he devoted hims[illegible] sculpture in marble. The gate and the bal[illegible] of the city hall at Toulon, which he bu[illegible] carved, were his first works. Fouquet com[illegible]sioned him to obtain in Italy a supply of Ca[illegible] marble for the embellishments of his pri[illegible] country seat at Vaux, but he had proceede[illegible] further than Genoa when he heard of the fa[illegible] his employer. He was then induced to se[illegible] Genoa, where he executed the statues of A[illegible]sandro Sauli and St. Sebastian in the churc[illegible] Carignano, that of St. Philip Neri, a group [illegible] the Assumption for the hospital, a Madonna [illegible] the Balbi palace and another for the Carr[illegible] palace, the gilt bronze tabernacle and ange[illegible] the church of St. Cyr, the altar of Nostra D[illegible]na delle Vigne, and the group of the "E[illegible]ment of Helen." He made also a magnifi[illegible] bass-relief representing the Assumption for [illegible] duke of Mantua. He was in the tide of pro[illegible]perity at Genoa, when in 1665, on the reco[illegible]mendation of Cavaliere Bernini, who on a vi[illegible] to France had greatly admired his works, [illegible] was recalled by Colbert, and appointed direct[illegible] of ship decorations at the dockyards of Toulon. On his arrival there he commenced building a large ship, Le Magnifique, adorned with carvings on a scale of unheard of grandeur; this ship was soon afterward lost at sea. He began an arsenal at Toulon; but its progress being hindered by official intrigues, he retired in disgust to his native city. While attending to his duties as naval director, he had obtained 3 blocks of Carrara marble, and out of one of them he had partly carved the group u[illegible] hich his fame mainly rests, his "Milo of rotona devoured by a Lion." Lenôtre, hav- g seen the work in its unfinished state, was o impressed with it that he bestowed unbound- d praise upon it in the presence of Colbert and ouis XIV.; in consequence of which Puget ceived orders to complete the group for the ardens at Versailles. It was finished in 1683. is group of Andromeda and Perseus was completed in 1685, and brought to Versailles by his on; 3 years later he himself went there with is bass-relief of Alexander and Diogenes. On is return to Marseilles, which he had already dorned with many edifices and monuments, e superintended the building of the church of he charity hospital, executed his last work in ass-relief, "The Plague of Milan," and spent is later years in comparative retirement. For imself and family he had built a house in a tyle suited to his own genius, the gate of hich was surmounted by a bust of Christ with he motto: *Nul bien sans peine.* In 1807 a olumn surmounted by a bust was erected in his onor by the city of Marseilles.

PUGET SOUND, a collection of inlets, sit- ated on the N. W. coast of Washington terri- ory, forming the S. termination of Admiralty nlet, which is connected with the Pacific by the trait of Juan de Fuca. The sound covers an rea of about 15 sq. m., and the narrows which onnect it with the inlet are about 4½ m. long nd 1 m. broad; all the approaches are completely commanded by Point Defiance on the E. he inlets, in the order in which they succeed rom the entrance, have been named, after the fficers of the U. S. exploring expedition, Carr's, ase's, Hammersley's, Totten's, Eld's, Budd's, nd Henderson's, and are united by passages hich form several islands and peninsulas. hey are all safe, deep, and capacious harbors, urrounded by fertile land and well supplied ith water. On many of the islands and pen- nsulas good slate and sandstone are found; nd the shores are covered with abundance of xcellent timber. A considerable extent of round is cultivated at the S. part of the sound, nd several saw mills have been erected on e shores. Timber, grain, butter, and cheese re exported to different parts of the W. coast f North and South America and to Australia. he sound was named after an officer in Van- ouver's expedition.

PUGHE, WILLIAM OWEN, a Welsh author, orn at Tyn y Bryn, Merionethshire, in 1759, ied in 1835. His original name was William Owen, to which he added that of Pughe late n life, upon receiving an inheritance. At the ge of 17 he was sent to London to earn his iving, and there made the acquaintance of Owen Jones, a tradesman and an enthusiast r ancient Welsh literature, with whose upport and encouragement he entered upon a ourse of study for the elucidation of that sub- ect. The two published in conjunction in 789 the poems of Dafydd ap Gwilym, a bard f the 14th century. This was followed by the works of other poets and by translations; and in 1801, a third Welshman, Edward Williams, being associated with them, they published the first two volumes of the "Myvyrian Archaiology;" a third volume appeared in 1807. Pughe also prepared a Welsh and English dictionary (1793–1803), and the "Cambrian Biography" (1803); published a Welsh magazine entitled *Y Greal*; translated into Welsh the "Paradise Lost" and Heber's "Palestine;" and edited "Ancient Laws and Institutes of Wales," printed by the record commission in 1841.

PUGIN. I. AUGUSTUS, an English architectural draughtsman of French extraction, born in the latter part of the 18th century, died Dec. 19, 1832. He was frequently employed in the early part of his career in making architectural drawings for engraving, but is best known by a series of elaborate works on the Gothic architecture of the middle ages. These comprise "Specimens of Gothic Architecture selected from various ancient Edifices in England," &c. (2 vols. fol. and 4to., with 114 plates, 1823), the descriptions of which were written chiefly by E. J. Wilson; "Architectural Illustrations of the Buildings of London" (2 vols. 4to., 1824), and "Specimens of the Architectural Antiquities of Normandy," &c. (1825–'8), both published in conjunction with John Britton the antiquary. He also made the drawings for a work entitled "Paris and its Environs displayed," and prepared, with the assistance of his son, "Gothic Ornaments selected from various Buildings in England and France." II. AUGUSTUS WELBY NORTHMORE, son of the preceding, born in England in 1811, died at Ramsgate, Sept. 14, 1852. From his father he acquired a taste for mediæval architecture, and first turned his attention to designing ornamental Gothic furniture and metal work. On these subjects he published "Designs for Gothic Furniture in the Style of the 15th Century" (1835), "Designs for Iron and Brass Work in the Style of the 15th and 16th Centuries" (1835), "Designs for Gold and Silver-Smiths' Work" (1836), and "Ancient Timber Houses" (1836), all of which had a material influence in promoting the late revival in the taste for Gothic forms. He also published "Contrasts, or a Parallel between the Noble Edifices of the 14th and 15th Centuries, and similar Buildings of the present Decay of Taste" (2d ed., 1841), a work which excited the animadversion of architects, chiefly on account of the caustic tone in which the author conveyed his ideas. Becoming a convert to the Roman Catholic faith, he devoted himself with singular earnestness to the study of ecclesiastical Gothic architecture, and thenceforth his talents were almost exclusively employed in the erection or embellishment of edifices connected with the public worship or discipline of the Catholic church, the number of which is said to exceed that undertaken by any other Englishman since the reformation. Among his early patrons was the earl of Shrewsbury, for whose seat of Alton Towers he designed a church, school house, and monastery. Such was his devotion to his faith that he invariably declined to design for Protestant places of worship, and seldom accepted commissions from Protestants for buildings for secular purposes. The chief exceptions to this rule were the gateway to Magdalen college, Oxford, and the elaborate mediæval ornamentation of the new parliament houses at Westminster. Having amassed a considerable property, he purchased an estate at Ramsgate, and erected thereon a house, church, schools, &c., all of which were dedicated to St. Augustine. Toward the close of his life his religious zeal perceptibly increased, and in 1850 he published a number of pamphlets testifying his devotion to his faith, among which were "An Address to the Inhabitants of Ramsgate," "An Earnest Appeal for the Revival of the ancient Plain Song," "The Present State of Public Worship among the Roman Catholics," &c. In the succeeding year his intellect yielded to the severe mental excitement in which he indulged, and for several months he was the inmate of a lunatic asylum. He recovered sufficiently to be removed to his own residence, but died soon after. In principle he was so thoroughly wedded to Gothic architecture, that he was unwilling, as he expressed it, "to deviate one tittle from its spirit." His works have had a powerful influence on contemporary and subsequent architects. His chief publications, in addition to those mentioned, are: "Examples of Gothic Architecture" (3 vols. 4to., 225 plates, 1838); "True Principles of Pointed or Christian Architecture" (1841); "An Apology for the Revival of Christian Architecture" (1843); and "Glossary of Ecclesiastical Ornament" (1844).

PULASKI, the name of counties in 7 of the United States. I. A S. W. co. of Va., bordered E. partly by New river, which, turning to the W., intersects it toward the S., Little river, a branch of New, completing the E. boundary; area, about 300 sq. m.; pop. in 1860, 5,416, of whom 1,589 were slaves. It lies between two mountain ranges, Walker mountain on the N. W. and the Blue ridge on the S. E. The surface is broken and the soil generally fertile. The productions in 1850 were 179,510 bushels of Indian corn, 35,284 of wheat, 63,367 of oats, 2,639 tons of hay, and 20,502 lbs. of wool. There were 5 grist mills, 5 saw mills, 5 tanneries, 9 churches, and 292 pupils attending public schools. Value of real estate in 1856, $1,707,526, being an increase since 1850 of 84 per cent. It is intersected by the Virginia and Tennessee railroad, which passes through the capital, Newbern. II. A central co. of Ga., intersected by the Ocmulgee and Little Ocmulgee rivers, and drained by their branches; area, about 650 sq. m.; pop. in 1860, 8,744, of whom 4,106 were slaves. It has a level surface toward the S. and rolling toward the N. The productions in 1850 were 229,815 bushels of Indian corn, 60,976 of sweet potato 5,501 bales of cotton. There were 2 saw 13 churches, and 127 pupils attending schools. Capital, Hawkinsville. III. A tral co. of Ark., intersected by the Ark river and drained by its branches; area sq. m.; pop. in 1860, 11,700, of whom were slaves. In the S. the surface is lev in the N. and W. hilly, and the soil is ately fertile. Lead, slate, and excellent are found. The productions in 1854 were 198 bushels of Indian corn, 26,960 of oa 2,038 bales of cotton. In 1850 there w grist mills, 3 saw mills, 6 churches, and pupils attending public schools. Capital tle Rock. IV. A S. co. of Ky., bordered the Cumberland river, and E. by the Castle; area, about 550 sq. m.; pop. in 17,203, of whom 1,330 were slaves. It diversified surface, with several elevated and contains iron, lead, and coal. The ductions in 1850 were 558,864 bushels dian corn, 13,385 of wheat, 125,002 of 6,883 lbs. of tobacco, and 34,876 of There were 35 churches, and 1,220 pupi tending public schools. Capital, Som V. A N. W. co. of Ind., intersected by T canoe river; area, 432 sq. m.; pop. in 5,703. It has a nearly level surface, equally divided between prairie and oak ings, and a generally fertile soil. The pr tions in 1850 were 27,593 bushels of w 95,915 of Indian corn, 15,050 of oats, 2,2 of hay, and 3,889 lbs. of wool. Capital, W mac. VI. A S. co. of Ill., separated from by the Ohio river, and bordered N. W. by C river; area, about 175 sq. m.; pop. in 3,950. It has a level and well wooded su and a fertile soil. The productions in 185 87,145 bushels of Indian corn, 16,326 of 1,474 lbs. of wool, and 25,695 of butter. Th were 5 saw mills, 2 tanneries, 2 churches 149 pupils attending public schools. It is tersected by the Illinois central railroad. C ital, Caledonia. VII. A S. co. of Mo., sected by the Gasconade river, and drained several of its branches; area, 1,332 sq. pop. in 1860, 3,834, of whom 56 were sla The surface is hilly and the soil generally tile. The productions in 1850 were 24 bushels of Indian corn, 11,352 of wheat, 838 of oats, 11,894 lbs. of wool, and 54,8 butter. There wero 2 grist mills, a tann and 75 pupils attending public schools. Cap tal, Waynesville.

PULASKI, Casimir (Pol. Kazimierz P lawski), count, a Polish patriot, who fo in the war of the American revolution, born 1747, died from a wound received in the at tack on Savannah, Oct. 11, 1779. He was son of a Polish nobleman, the starosta of W reck, who was the chief organizer of the cele brated confederation of Bar, which was also signed by his 3 sons (1768). Casimir while st young had been in the service of Duke Char of Courland, and now entered heartily into the ar for the liberation of his country from the ower of Russia. Forced to cross the Dniester, e took refuge after the storming of Bar in e monastery of Berditchev with 300 men, and fter sustaining a siege of several weeks capitulated on the condition that the garrison should e set at liberty. He himself, however, was ept prisoner, and was not freed until he had ledged himself to bear proposals for a reconiliation to the chiefs of the confederates; but s soon as he was set at liberty he refused to eep a promise extorted by violence and fraud. oining his father in Moldavia, he made incurions across the Dniester, and attacked the ussians and fortified posts within the Polish orders. He carried on a desultory war in various parts of the country, making up for the ant of discipline and numbers in his troops by e activity of his movements, until an unsuccessful attempt to gain possession of the person f the king Stanislas Augustus, in 1771, caused sentence of outlawry and death to be passed gainst him, on the ground that it was his intion to assassinate the monarch. The coalion of Austria, Russia, and Prussia for the conuest and division of Poland, under the pretence f protecting the government, was soon after ompleted, and resistance became hopeless. ulaski, who had lost his father and brothers the war, made his way to Turkey after a ries of adventures and perils; but, unable secure any important aid from that couny, he went to France. There he determined to join the Americans, then fighting for dependence, and, with high recommendaons from Franklin to Washington, arrived Philadelphia in the summer of 1777. He first served in the army as a volunteer; but days after the battle of the Brandywine, in hich he distinguished himself, he was apointed by congress commander of the cavalry ith the rank of brigadier-general. After 5 onths at the head of this body he resigned s command, and entered the main army at alley Forge in March, 1778. There he proosed to organize an independent *corps*, consting of cavalry, lancers, and light infantry, d this proposal was accepted by congress, ho empowered him to raise and equip such a dy of men to the number of 268, and, if the periment were successful, to a still larger umber. By October 330 men were in this rps, which was called Pulaski's legion. With is he marched, in the beginning of Feb. 1779, South Carolina to put himself under the ders of Gen. Lincoln, then commanding the partment of the South. He reached Charlesn May 8, and while there vigorously opposed e project entertained by the governor and uncil of surrendering the place to the British my then before the city. In September the ench under Count d'Estaing and the Americans prepared to besiege Savannah, and during e march to Georgia Pulaski's legion did efctual service in reconnoitring. When near vannah he heard of the landing of the French general, and received from him a complimentary letter, in which he said that, "knowing Count Pulaski was there, he was sure he would be the first to join him." The two armies united on Sept. 16, and on Oct. 9 it was determined to carry the town by assault. Pulaski was placed at the head of the French and American cavalry, and during the engagement received a mortal wound. He was taken on board the U. S. brig Wasp, which lay in the Savannah river, died after lingering two days, and was buried in the river. A monument to his memory voted by congress has never been erected, but one was raised by the citizens of Georgia in Savannah, of which Lafayette during his triumphal progress through the United States laid the corner stone.

PULCI, LUIGI, an Italian poet, born in Florence in 1431, died there in 1487. He obtained through the patronage of the Medici family an inferior office under the republic, and was one of that brilliant company for whom Lorenzo de' Medici kept a place at his table. Urged by the mother of his patron to employ his genius in some nobler work than the casual effusions that he put forth from time to time, he began the composition of his *Morgante Maggiore*, a poem which, while it classes him as the last of the old romancers, also entitles him to rank as the first in point of time of the Italian epic poets. The subject is that legend of Charlemagne and his paladins which refers to the treason of Gan, Gano, or Ganellone, a personage very bitterly denounced wherever his name is mentioned in the ancient romances for his complicity with the Saracens in bringing about "the fatal day of Roncesvalles." Morgante is represented by Pulci as a giant, and is the principal actor in the poem, though the real hero is Orlando. The dignity of the epic is preserved wherever Orlando appears; the incidents that relate to him are natural and impressive; but in all other parts the poet gives way to what is grotesque in the old legends, and relates the absurd and extravagant fables in colloquial manner and with an air of banter and burlesque exquisitely humorous. It was first published in Florence in 1481. One canto of it was translated into English by Lord Byron, and the poem was his acknowledged model with respect to style in "Beppo" and "Don Juan." Pulci was also the author of a number of sonnets and other short pieces.

PULKOWA. See OBSERVATORY.

PULLEY. See MECHANICS, vol. xi. p. 326.

PULQUE, a favorite drink of the inhabitants of Mexico and of Central and South America, prepared from several varieties of the *agave Americana*, from the fibres of whose leaves the Mexicans also make their paper. The plant is called *metl* by the Mexicans and *maguey de Cocuiza* in Caracas. Just before it blossoms the sap is collected in pitchers by cutting the buds, and is allowed to ferment slightly. In this state it is relished by foreigners, but the natives prefer it when it has passed into its second fermentation, at which time it has an acid taste and a smell like that of putrid meat. When allowed to ferment still further it turns into vinegar, and if boiled down becomes sirup. Pulque brandy is made of it, and when water and sugar are mixed with the sap and the whole allowed to ferment a few hours, the drink is called *tepache*.

PULSE, the throbbing of the arteries caused by the intermitting impulses communicated to the blood by the heart's contractions, propagated as a wave by the elasticity of the arteries, perceptible to the touch in all but the smallest vessels, and visible when they are superficial or exposed, the pulsation being nearly synchronous with the contraction of the left ventricle. At each pulsation the capacity of the artery is augmented by an increase of diameter and by a partial elongation, the vessel being thereby lifted from its bed; this increase has been estimated for the carotid artery as $\frac{1}{23}$ part, but this can be only an approximation. The wave of the contained blood may be propagated with a different velocity from the wave along the walls of the artery, explaining many cases of double pulse, especially after the subsidence of vascular excitement. The variation from synchronism between the ventricular contraction and the pulse in a state of health is from $\frac{1}{7}$ to $\frac{1}{6}$ of a second, depending on the distance of the part examined from the heart; this interval may be increased in atonic conditions of the arterial system. The pulse is liable to vary, within the limits of health, from the several diversities of age, sex, stature, muscular exertion, condition of the mind, state of the digestive process, and period of the day. The following table is given by Carpenter as an approximation to the average frequency of the pulse per minute at different ages:

In the fœtus	140 to 150
Newly born infant	130 to 140
During the 1st y'r.	115 to 130
" " 2d "	100 to 115
" " 3d "	95 to 105
" " 7th to 14th year	80 to 90
During the 14th to 21st year	75 to 85
During the 21st to 60th year	70 to 75
In old age	75 to 80

According to Dr. Guy, the pulse of the adult female usually exceeds that of the adult male of the same age by 10 to 14 beats a minute; according to Volkmann, the pulse is less frequent as the stature is greater, about 4 beats for a half foot in height. It is well known that muscular exertion increases the frequency of the pulse. The effect of posture has thus been expressed by Dr. Guy:

Average beats per minute in	Standing.	Sitting.	Lying.
Healthy males	81	71	66
Healthy females	91	84	79

According to this the difference between standing and lying in the former is $\frac{1}{5}$ of the whole, in the latter $\frac{1}{8}$; when this change is effected by muscular effort the variation is greater, accounting for many cases of sudden death in persons with disease of the heart or in very weak conditions on quickly assuming an erect position. Mental excitement, the digestive process, alcoholic drinks, and elevation above the sea, accelerate the pulse; as a general rule, though with numerous exceptions, it is more frequent in the morning than in the evening, and in sanguine than in lymphatic temperaments. The pulse is slower during sleep, and from the effect of rest, diet, cold, venesection, and the action of many drugs, especially digitalis, aconite, and hellebore. The pulse may be counted in any artery, and in a manner familiar to all, but most conveniently in the radial at the wrist, in the carotids, temporals, brachial, or femoral. The average numerical proportion of the arterial pulsations to the respiratory movements varies from 4 or 5 to 1; when this proportion is widely departed from, there is either some general diseased condition accompanied with fever, some obstruction to the proper aëration of the blood, or some disorder in the nervous system; in inflammatory or acute diseases, fevers, &c., the pulse may be raised to 120 and 160 in the adult, and so that it cannot be counted in the child; in pneumonia, with the quickened pulse the number of respirations increases more rapidly, the above proportion becoming as 3 or even 2 to 1; in hysteria similar increase may occur in both without any serious cause. The pulse is continued even into the capillaries; the respiratory pulse, long ago described by Haller, is the partial emptying of the veins near the heart by inspiration and their partial filling during expiration, which may be seen in the neck of thin persons or those suffering from pulmonary diseases; in the latter diseases, when there is obstruction to the exit of the blood through the pulmonary artery, the tricuspid valve does not close completely, and regurgitation takes place into the superior vena cava, causing a pulsation in the jugular veins synchronous with that in the carotids from the left ventricle; there is also a venous pulse in varicose aneurism, where the artery and vein communicate. Galen first drew attention to the pulse as a diagnostic sign, and enumerated more than 30 different conditions of it, for which see Chomel's *Pathologie* ([illegible] Paris, 1824); when it is above 90 it is called febrile; it is also irregular or intermittent in diseases of the heart, great vessels, and pericardium, and some spasmodic affections. In fishes the heart beats 20 to 30 times in a minute, and in some of the lower forms pulsations occur in accessory lateral hearts or swellings, both venous and arterial; the pulsations are much slower than this in reptiles, and in the actively breathing birds are more than 100 in the natural state.

PULSZKY, Ferencz Aurel, a Hungarian patriot and author, of Polish descent, born at Eperies, Sept. 17, 1814. He studied in his native town and at Miskolcz, in 1833 passed the examination as an advocate, in 1836 travelled through Germany, Italy, England, Scotland, and Ireland, and in the same year became a member of the archæological institute of [illegible] and in 1837 a member of the Hungarian academy. Chosen to represent his native county of Sáros in the diet of 1839-'40, he joined the op- position or liberal party, and was named secre- ary of a commission to frame a code for Hun- ary. He was not reëlected to the diet, but rdently advocated the liberal cause in the olumns of the Augsburg *Allgemeine Zeitung*, and was a prominent supporter of the Hunga- ian union (*védegylet*) for the protection of ome manufactures. Upon the revolution of March, 1848, he became, under Prince Ester- azy at Vienna, under secretary of state for Hungary. His influence upon Hungarian af- airs and his activity in this position were very reat; and early in Oct. 1848, when an open onflict between Austria and Hungary was im- minent, Pulszky received an autograph letter rom the emperor, which informed him that is "resignation was accepted," though no esignation had been tendered. A few days ater, however, a revolutionary outbreak drove he emperor from his capital. When Windisch- rätz became master of Vienna, Pulszky escaped o Pesth, and was subsequently sent to London y Kossuth, to endeavor to obtain from Eng- nd some support for the Hungarian cause. e remained in England until joined there by ossuth, whom he accompanied on his visit the United States. In March, 1861, having emoved from London to Turin, he was elected member of the diet of Pesth by the district Szécsén in the county of Nógrád, but was revented from reëntering his native country y the Austrian government. Pulszky has pub- ished *Aus dem Tagebuche eines in Grossbri- annien reisenden Ungarn* (Pesth, 1837); *Die akobiner in Ungarn* (2 vols., Leipsic, 1851); Tales and Traditions of Hungary" (London, 851); "Red, White, and Black," an account travels in the United States (London, 1852); *deen zur Philosophie der Geschichte Ungarns*, nd several other books of a miscellaneous char- cter.—Theresa Walther, wife of the preced- g, born in Vienna in 1815, accompanied her usband (to whom she was married in 1845) England, and subsequently on his visit to e United States, and, in addition to her joint thorship of the "Tales and Traditions" and Red, White, and Black," has written "Me- oirs of a Hungarian Lady" (2 vols., London, 850).

PULTENEY, William, earl of Bath, an Eng- h statesman, born in 1684, died in 1764. e was educated at Westminster school and at hristchurch, Oxford, travelled on the conti- ent, and became member of parliament for e borough of Hedon in Yorkshire. This po- tion he owed to his guardian, Henry Guy, ho subsequently left him a legacy of £40,000 d landed estate to the amount of £500 a ar. Having joined the whig party, he con- nued to represent Hedon throughout the hole reign of Queen Anne, and conducted mself with so much warmth in the prosecu- n of Sacheverell, that when in 1710 the tories obtained control of the government, they removed his uncle John Pulteney from the board of trade. He defended Walpole in the prosecution instituted against him in 1712; and when that minister resigned in 1717, Pulteney also gave up his office of secretary at war, to which he had been appointed on the accession of George I. But not long after a coolness sprang up between the two friends; and although, when Walpole resumed office in 1720, Pulteney was appointed cofferer of the household, the latter went over to the opposition in 1725, and after his dismissal became one of the most bitter enemies of the minister. He allied himself with Bolingbroke, and published pamphlets in which he attacked the ministry so virulently as to bring about a duel in 1731 between himself and Lord Hervey. Through the brilliancy of his speeches, and the patriotic sentiments with which they were filled, he became the most popular man in the nation, and in 1742 succeeded in driving Walpole from power. When in opposition he seems to have made the declaration that he would never take office; and now, when all England was at his feet, he constructed a cabinet, leaving himself out, though accepting a peerage. The people now considered themselves as betrayed, and by the new ministry he was treated with indifference and abuse. As Chesterfield wrote: "He shrunk into insignificance and an earldom." When in 1746 the Pelham ministry resigned, Pulteney became premier; but so little influence had he, that he was unable to obtain the assistance of any men of importance, and in consequence he held office for only two days. After this he was comparatively little in public life, but in 1760 he published "A Letter to Two Great Men" (Pitt and the duke of Newcastle), which seems to have attracted attention for a time. As his only son had died before him, the peerage in his family became extinct.

PULTOCK, Robert, an English author, whose only known work, published in London in 1750, is a romance, entitled "The Life and Adventures of Peter Wilkins," which describes an imaginary race of flying islanders in the South Pacific. It has gone through many editions both in England and the United States, and has become a standard work of fiction. The name of the author was unknown till 1835, when, at a sale by auction of books and manuscripts which had belonged to Dodsley the publisher, the original agreement for the copyright of the book was found, in which Pultock is described as "of Clement's Inn, gentleman," from which it is supposed that he was a bencher of the Inn. From the agreement it appears that he had sold his story for £20, with 12 copies of the work, and a set of the first impressions of the engravings that were to accompany it. Nothing more is known of him. "His book," says Southey, "is a work of great genius, and I know that both Sir Walter Scott and Mr. Coleridge thought as highly of it as I do. His winged people are the most beautiful creatures of imagination that ever were devised."

PULTOWA, or **Poltava**, a government of European Russia, province of Ukraine, bounded N. by Tchernigov and Koorsk, E. by Kharkov, S. by Ekaterinoslav and Cherson, and W. by Kiev; area, 18,684 sq. m.; pop. in 1856, 1,753,144. The surface consists of an almost unbroken plain, which declines gradually to the S. W., where the Dnieper flows along the frontier for upward of 200 m., and receives the drainage of the government by several rivers, the most important of which are the Sula, Vorskla, and Orel. Potters' clay, lime, chalk, and saltpetre are the most valuable minerals. The soil is remarkably fertile, and only a small portion in the S. E. part is barren. The principal crops raised are barley, oats, wheat, buckwheat, and millet. Large numbers of cattle and sheep are reared. The manufactures consist of woollen goods, leather, and brandy. Only a small percentage of the inhabitants can read and write.—**Pultowa**, the capital, is situated near the junction of the rivers Poltavka and Vorskla, 445 m. S. S. W. from Moscow; pop. in 1851, 20,071. It is surrounded by a wall and defended by a citadel near the centre of the town. There are a cathedral, 11 churches, a convent, and a school for cadets. The streets are broad and well laid out, and there is a large square with a monument in the middle erected in memory of Peter the Great, who near the town won the great battle (July 8, 1709) in which the Swedes were totally routed and Charles XII. obliged to take refuge in Turkey. (See Charles XII.) A fine obelisk stands upon the field, and divine service is annually performed in commemoration of the victory.

PULU, or **Vegetable Silk**, the long silky fibres that cover the stipes or stalks of a species of fern which grows in the Sandwich islands. A similar product has been known in Sumatra, obtained from a fern called the *penghawar* or *penawar djambi*. The long, sparkling, brown, hairy-like fibres which clothe the stems, resemble more the covering of animals than of plants; and it is supposed that from this plant originated the ancient fable of the Scythian or vegetable lamb. This was said to be an animal that sprung from a seed out of the earth, to which it continued rooted. It had a sort of flesh and blood, and lived by browsing all within its reach, till finally it died for want of further sustenance. The Russian name of the animal is *barometz*, which has been applied as a specific name to the plant. The Sandwich island pulu is the produce of a fern of the genus *cibotium*, the specific name of which is uncertain; or it may be produced by several species of this genus. It grows on lands elevated from 1,000 to 4,000 feet above the sea, and frequently reaches the height of 15 feet. Each plant, when 4 years old, produces 2 or 3 ounces of the fibres. These are gathered by women and children, and spread on rocks or mats to dry; the article is sold to the larger dealers, and packed i for exportation. The trade is princip fined to the districts of Hilo, Hamak Puna on Hawaii; and the shipment San Francisco, Australia, Vancouver's i &c. From the custom house returns waii, the trade is seen to have increased 2,479 lbs. in 1851 to 318,220 lbs. in 18 the introduction of the article into San cisco in 1854, it sold for 28 cts. per l now regarded as a staple export of the wich islands. By the natives it has l used for pillows, &c. When woven i duces a fabric intermediate in chara tween silk and wool. The East Indian has been introduced into the Dutch p copœia, and is employed, like cotton, tow, or beaver nap, as a styptic.

PUMA. See Cougar.

PUMICE, a porous feldspathic scoria volcanoes. The pores are linear, and as often to be barely visible except by th of a magnifying glass. Its specific gr 2.2 to 2.4, but by reason of its spongy pieces of it are often buoyant enough on water. It consists chiefly of silica sometimes 17 per cent. of alumina, 6 per of soda, and 4 of potash. It is of shades of color, passing into yellow and The chief source from which it is obtained commercial purposes is Campo Bianco, the Lipari islands, where it forms a nearly 1,000 feet high. In the arts pum largely employed, mostly in a pulverized as a polishing material. It is also used i for grinding and smoothing surfaces of plates, leather, &c.

PUMP, a machine for raising or water, operating in general on the pr that the air being exhausted from a pi lower end of which is in a reservoir of the water is pushed by the external pr of the atmosphere up this pipe, where various contrivances it is discharged higher level. Respecting the introdu pumps nothing certain is known. Wilk states that an instrument resembling a p pump is often represented in the sculptures the ancient Egyptians; but such a ma does not appear to have been used by nations of antiquity, nor by the Greeks Romans, nor by any rude nations of later The contrivances of the Asiatics for ra water are wheels furnished with buckets their periphery, the pole and bucket most ancient as well as modern use, and Archimedean screw. Several classes of are recognized, as lifting, forcing, rotary, centrifugal, distinguished from each other the different contrivances for exhaustin air and raising the water. The lifting the most simple form of the machine pipe itself is the working chamber, and it a piston furnished with a valve openin ward is made to move up and down. The e valve the air is forced up by the down oke, and is raised as the piston ascends. e water at the bottom follows the air into tube and through the valve till the weight the column counterbalances the pressure t pushes it. If a pump could be made with ton and valve working air-tight, the height the column of water thus raised should be t sufficient to counterbalance by its weight e atmospheric pressure; and this at the level the sea is 34 feet; but 28 feet is commonly e height which the water reaches. To nearly is height the water may be discharged through hole in the side of the tube, by merely taking the atmospheric pressure as described, or what is called suction, a portion of the water ing allowed to flow up through the piston, hich works below this opening. To raise it gher, the piston rod and tube are extended ward to any height, and the water, continu- y accumulating above the valve in the piston th each stroke, is at last raised to the outlet. prevent the water from flowing back as the ston goes down, a second valve also opening ward is set in the tube within a few feet of e bottom. With such pumps water is raised ore than 100 feet, sometimes even 200 feet, a single lift. (See MINE, vol. xi. p. 527.) e pumps used in houses for raising water the upper stories are lifting pumps, furnish- d with a side discharge pipe, rising above the orking barrel to the required elevation.—nother class of pumps is the forcing pump. this the piston, called the plunger, is with- t a valve, and works in a chamber through hich the water does not pass, but, entering below as the piston is raised, is forced t by the return stroke, passing from the ttom of the chamber into a side pipe rough a valve opening outward, and thence herever the pipe leads. The valve in the pply pipe opening inward, the water is pre- nted from flowing back through it. Double- ting forcing pumps have been made, the pply pipe and discharge pipe connected th the working chamber on both sides of e piston, so that as this is moved in either rection it draws water on one side and dis- arges it on the other. With an air chamber perfectly uniform flow is thus secured. The actical objection to this kind of pump is the ultiplication of valves in one machine, two of hich are required on each side of the piston. hese in all pumps are the parts that fail or get t of order. It is found better in practice to e two distinct pumps, one at each end of a ver beam, the piston of each acting in turn ith the descent of the beam. After this man- er fire engines are commonly constructed of o forcing pumps, discharging into a common r chamber. (See FIRE ENGINE.) Four pumps f these have also been made to work together, eir strokes following regularly in turn. Forc- g pumps of great power, such as are used for ising water in mines, which are occasionally ade to raise a column even 300 feet at one lift, are provided with a long solid plunger, which works in a tight stuffing box, but in the barrel immediately below this loosely. The rods of forcing pumps are outside of the lifts or pipes, entering only the working chamber. In large pumps they act by their weight, the power being exerted to lift them and not the water. In lifting pumps the rods usually pass through the whole height of the discharge pipe, which must be vertical, and the power is exerted to lift them and the column of water together.—ROTARY PUMPS. A great variety of pumps have been contrived of the rotary class. In these the piston is formed of one or more wings attached to a horizontal axis which passes through the ends of a very short cylinder. Revolving in this cylinder, the wings first produce a partial vacuum, and then propel before them the water that enters by the supply pipe. The varieties of this class of pump differ from each other in the contrivances by which the water is prevented from being carried round the entire cylinder and is forced up the discharge pipe. These are numerous, and many of them exhibit much ingenuity. One, invented about the year 1818, and known as the Massachusetts pump, resembles the blowing fan. Four wings or vanes are attached to an axis which revolves a little to one side of the centre of the cylindrical box, so that while the vanes on one side run close to the inner surface of the cylinder, the space that separates these grows larger round to the other side, till it opens into the discharge pipe, which goes off in a line tangent to the cylinder. The water is drawn in through an opening around the axle on each side, and being swept round rapidly by the revolving vanes is thrown up the discharge pipe. The impossibility of the vanes passing from the open space to the close space on the other side of the outlet without being followed by a portion of the water, evidently somewhat diminishes the economical working of this machine. The French have long employed a very ingenious rotary pump known as the *pompe rotative de Dietz*. In this the entrance and exit pipes enter close together on the same side of the cylinder, but the connection between them is round the annular space between the inner surface of the cylinder and the outer surface of a central drum. To this drum, which is carried by a belt or otherwise, are set in longitudinal slots 4 vanes or tongues as long as the cylinder, and dividing the annular space into 4 equal compartments. The tongues by the action of a spring within the drum are pressed out against the inner surface of the cylinder, and as they sweep round each one carries the water in the compartment before it forward to the place of discharge. The water can go no further round owing to the annular space being contracted on this side by a curved iron plate, which reduces the diameter of the cylinder the whole width of this space. The tongues running against this plate are pushed in even with the surface of the drum, and as the plate recedes on the other side of the place of discharge they are pressed out again, and water from the supply pipe flows in after each tongue, filling the compartment. A similar rotary pump, known as Cary's, has proved the most successful of this class of pumps in the United States. In another very old form of rotary pump the projections upon the drum are fixed and slope off like a wedge in the direction toward which they move. Each one in turn runs in under and lifts a rod which acts as the "butment" or dam to check the flow of the water round the annular space, and which immediately on the passage of the projection or vane drops back again, acting like a stamper when raised and dropped by a cam. The water in front of the butment is forced up a vertical pipe in which is a valve that prevents its return. At the great exhibition of 1851 comparative trials were made of different rotary pumps, among which those of Mr. Appold and Mr. Gwynne were regarded as the most efficient. In the former the rotating fan consisted of 3 circular plates a foot in diameter, the two outer ones 3 inches apart, and the third midway between these. Each outer disk was furnished with an opening of about 6 inches diameter around its axis for admitting the water in which it worked. The propelling vanes in the division on each side the central plate were 6 in number, and instead of standing straight out from the centre they curved back till they terminated nearly in a tangent with the circle that would circumscribe them. In comparing the working of this pump with curved, with straight radial, and straight inclined arms, the last set back at an angle of about 45°, the percentage of effect to the power exerted was found in a lift of about 18 feet to be for the first form 65, for the second 24, and for the third 43. All the tests showed that a great advantage was gained in the use of curved vanes. The number of revolutions of the fan per minute in these trials was from 620 to 870. Pumps of this character are adapted only for moderate lifts, rather under than over 20 feet. They have the advantage of great portability, are easily set up in any place, and are competent to discharge large volumes of water at low elevations with great economy. They are not obstructed by mud and gravel, which might be destructive to a pump with valves. They have proved especially serviceable for large draining operations, pumping out coffer dams, &c. One was constructed in England for draining, with a wheel 4½ feet in diameter, and run with an average velocity of 90 revolutions per minute; it raised in the same time about 15,000 gallons of water to the height of 4 to 5 feet. For further particulars respecting rotary pumps reference may be made to an article entitled "A Historical Review of the Centrifugal Pump," in the "Practical Mechanic's Journal," Sept. 1851, and the jury report of the exhibition of 1851.—A pump of entirely different character from any of those named, and used to some extent in domestic wells, is the chain pump. It has also been in general use as a ship pump, particularly in large ships belonging to the navy. An endless chain carrying a series of hollow pistons or buckets, which are adapted to pass through a pipe, is suspended upon a wheel at the top of the well, and passes around another under the surface of the water below. As the upper wheel is turned by a crank its teeth catch in the links of the chain and raise the full buckets on one side, which are discharged at the top as they turn over, and go down empty to be refilled. The recommendation of this pump is the convenient method of working it by turning the crank. It is, however, on account of the continual loss of water in ascending, not economical in its application of power.—Pumps for the use of ships, of which many kinds are now employed, are necessarily constructed with particular reference to the danger of their being obstructed by the loose materials that are likely to be floating in the bilge water, such as chips, oakum, or grain, or other articles derived from the cargo. The pipes are large and capacious, and the valves are made to drop freely into their seats. It is moreover important that they should be accessible for removing any obstruction with the least possible loss of time.—The most powerful pumps in use are those employed for draining deep mines, and, as stated in the article **Mine**, already referred to, they, as well as the pumping engines, have been brought to their greatest perfection in Cornwall, where their improvement has been long stimulated by the system of periodically publishing the performance of the principal machines. They have thus become of interest not merely as draining machines, but as measurers of the work performed by the steam engines; and this being in the way of the regular work of these engines, they are the best practical dynamometers. The use of Cornish pumps and engines is not however limited to mines, but they are now applied to supplying water for the use of towns, having been introduced first in London in 1839 by Mr. Thomas Wicksteed, an eminent hydraulic engineer, since which time they have been generally recognized as the standard machinery for this purpose. On this account a more detailed notice of them and of the work of some American pumping engines may be appropriately introduced. The use of the Cornish lifting pump is mostly limited to taking water from the bottom of shafts while these are sinking. When the shaft has reached a depth of 100 to 150 feet below the level of discharge of the water, a reservoir is constructed to one side in the rock at the bottom, and a forcing pump is permanently set to force the water up to the outlet, and the lifting pump is made to commence anew and follow the shaft as it is sunk 100 or 150 feet deeper. The superiority of the lifting pump for use in sinking consists in its being more easily moved and adjusted than the forcing pump, and in its greater efficiency as a suction pump, raising the water from greater depths to the level of its working chamber. The forcing pump would otherwise be preferred, because the weight of its rods, which must at any rate be lifted, is applied in descending to forcing up the water, and because it is more easily kept in order, the pump rods being external, and not concealed in the pipe, and moreover not obstructing the flow of water by partially filling the ascending pipe. The lifting pump is of various dimensions, from 6-inch to 16-inch bore of pipe. This is made in lengths of 9 or 10 feet, which are added one after another upon the top as the pump goes down. The bottom length, called the windbore, stands upon the rock in the bottom; and to resist the blows and shaking from the blasts exploded around it, this piece is made of the strongest mixture of cast iron, and the shell is not less than 2½ inches thick. The lower end is not open, but rounded off and perforated with holes for straining the water. The diameter is large enough to admit the next upper length, and an accurate fit is made by boring and turning these two pieces, so that the lower one may slide down 9 feet and keep the connection perfect while the upper remains fixed. The upper connects above with the "door piece," a chamber 2 feet or more square, in the bottom of which the lower valve is seated. One side of this chamber is closed with a movable plate, strongly secured by screw bolts, which being removed, the interior is exposed and access is had to the valves. The lower valve is a circular box with tapering sides made to fit closely in its seat, and it has either a single large clack or two small ones hinging near the centre. The clacks are metallic plates lined with sole leather. Upon the top of the door piece the working barrel may be bolted down, or an intervening circular chamber may be introduced, the diameter of which gradually contracts upward to that of the working barrel, which is then bolted upon it. This barrel is bored perfectly smooth within, that the piston may move up and down with a uniformly accurate fit, and its diameter is an inch or more less than that of the discharge pipes that succeed it above. The bucket, or valve, attached to a strong iron rod (the continuation below of the wooden rods that go up to the surface), is packed like the piston of a steam cylinder, and is provided with either one or two clacks. It is reached for repair or replacing either by letting it down into the chamber or raising it up through the pipes to the top. The pipes above are carefully added one upon another in a perfectly vertical line, each length being of 9 feet and secured upon the one below by bolts through the flanges with which the pipes are furnished at each end. The thickness of the metal in these pipes is usually 1½ inches. The pump rods, in straight lengths about 4 inches square, are added on at the top together with the pipes, the joints being spliced by a sort of dovetailing and secured by long wooden strips at the sides, the whole strongly bolted together. The joinings must be skilfully made so that the rod shall hang in the centre of the pipes the whole way down. The discharge at the top is into a wooden box and spout fitted around the upper pipe under the flange.—The forcing pumps for large operations are of much greater range in their dimensions than the lifting pumps, the working barrel and main discharge pipe of some of them amounting to 73 inches[*] in diameter. The pump itself consists of the working barrel, a chamber or door piece below this, and the suction piece with its valve as in the lifting pump on the same vertical line. But the working barrel is not continued upward into the discharge pump. A plunger of nearly its full diameter enters it at the top through a stuffing box, and moves up and down with a stroke of 6 to 12 feet or more, according to the size of the pump. From the chamber the water, forced out by the down stroke, passes into an adjoining apartment on one side, and thence up the ascending pipe, which is bolted on this apartment by the side of the working barrel, which is bolted on the other. The air chamber for giving uniformity to the flow is connected with this pipe. The rod from the working barrel may pass up directly to the lever beam of the steam engine, or be secured at any convenient distance up the shaft to a main rod working other pumps on different levels. The application of steam power to work forcing pumps is after the same plan in mining operations and in water works for supplying cities. The steam, admitted to but one side of the piston of the steam cylinder, acts directly, or by the lever beam, to lift the weight of the pump rods; or if this is not sufficient to counterbalance the weight of the column of water and the friction, and move moreover with the required velocity, more weight is added in the plunger. By this arrangement the column of water is not set suddenly in motion by a rush of steam, the force of which gradually diminishes toward the end of the stroke; but starting slowly the descending weight gains velocity, till the piston is received at the end of the stroke against the elastic cushion of steam in the head of the cylinder.—In the United States forcing pumps of very large dimensions are employed at the water works of many of the cities, and these are driven by pumping engines of remarkable efficiency. (See AQUEDUCT.) These were chiefly made by the most competent engineers in the country, who have vied with each other to produce engines that should exceed the Cornish in simplicity, cheapness, and durability, and equal them in economy of performance. Among the largest of these are the Cornish engines at the Fairmount water works, made in Philadelphia, and others at Belleville, N. J., made at Cold Spring, N. Y.; and of the American, the crank cam engine at Hartford, the double direct-acting engine at Brooklyn, N. Y., both built at Hartford, and the direct-acting double cylinder engines at Cambridge, Mass., built by Mr. H. R. Worthington of New York. Of these trials have been made under the direction of a board of distinguished engineers specially appointed for the purpose of determining their comparative capacities. The results of their investigations were presented in a "Report on Trials of Duty made in 1857 and 1859 upon the Brooklyn, Hartford, Belleville, and Cambridge Pumping Engines," from which the following summary is obtained. Expressed according to the formula of duty adopted in Cornwall, the Brooklyn engine raised 60,798,200 lbs. one foot high with 100 lbs. of coal; the Hartford, average of two trials, 58,865,115 lbs.; the Cambridge, 71,278,486; the Belleville, average of 3 trials, 71,062,545 lbs. Some allowances warranted by the circumstances having been made, the engines were finally rated in the following order of merit:

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[*] An engine with 8 pumps of this size was ordered by the Haarlem Meer commissioners, after satisfactory operations of the [illegible] inch pumps, noticed in the article DRAINAGE, vol. vi., p. [illegible]

Engines.	Lbs. lifted 1 ft. high with 1 lb. of coal.	Duration of trial, hours.
Cambridge, 1st trial	669,411	9
" 2d "	675,746	14¾
Hartford, 1st trial..........	614,426	17¾
" 2d "	646,994	12
Belleville (Cornish).........	628,288	12
Brooklyn..................	601,407	26
Spring Garden, Philadelphia (Cornish)................	589,053	48

The last was an independent trial made in 1856 by another engineer before these investigations were proposed. Though the results fall short of the duty of the Cornish engines working under the most favorable circumstances at the mines in that particular service for which they were specially designed and adapted (see MINE), it is well understood that, if subjected to the same severe methods adopted in these trials, no essential superiority would be found in the working of the Cornish engines.—Pumps are employed to feed steam boilers with water, forcing it in against the head of steam. Each engine is supplied with such a pump, and to economize fuel the water employed is the hot water from the exhaust pipe. The plunger is connected with the lever beam of the engine, or with a crank upon one of the shafts, and the sliding valves for admitting the water and regulating its exit are also moved by the machinery of the engine. The need of an independent steam pump for this purpose, which might be set in operation at any moment, whether the main engine were working or not, and which moreover might be conveniently applied to other purposes, as a pump for raising water, as a fire engine, &c., has led to the invention of some of the most efficient and useful pumps. The best and most extensively used is the steam pump patented by Messrs. Worthington and Baker of New York in 1849, now much improved by Mr. Worthington in what is called the duplex pumping engine. The original pump is of itself a small horizontal high pressure engine, fed directly from the boiler, and constructed like other engines of this character, so far as need be to obtain the alternate movement forward and backward of the piston rod. This rod is prolonged from the steam cylinder, and within a distance of one to two feet it enters the forcing pump, which is set directly on a line with the cylinder and upon the same support. The rod terminates in the plunger of the pump, which is fitted to a bore of smaller diameter than the steam cylinder. By this arrangement any pressure of steam applied to the steam piston must be effective to drive this forward and carry the plunger of smaller area against the same pressure. Thus with each stroke a small quantity of water is propelled into the boiler by the expenditure of the larger bulk of steam. The efficiency of the pump is increased by the plunger being made double-acting, and by an ingenious arrangement of the water valves over the pump, which are exceedingly easy of access and adjustment. From the valves the water passes into an air chamber, whence it is delivered in a continuous stream. The contrivance for sliding the valve in its seat upon the upper side of the steam cylinder is simple and ingenious. Upon the piston rod, half way between the two cylinders, is fixed an upright arm, which is carried each way with the piston. At its upper end it slides along the valve rod, and at the end of each stroke it hits a tappit or nut on this rod with sufficient force to move the valve. To insure this being always carried far enough, so that it shall not stand directly over the passages for the steam and exclude this from both ends of the cylinder, the water passages in the pump are so arranged, that at or near the end of the stroke the resistance of the water is reduced and the plunger slips instantly forward till checked by the action of the steam in the steam cylinder. These pumps are employed in numerous large manufactories and distilleries for pumping water and other fluids; and in open quarries they have proved a very convenient and powerful means of drainage, the pump being set in the bottom, while the steam may be conveyed to it from boilers at the top of the bank or other point.—The improvement is designed to counteract the thumping action of the piston, which sometimes takes place when the pump is worked too rapidly and under great pressure—a result of the momentum of the piston, similar to that which occurs with the weighted plunger of the Cornish pump. To produce an even, smooth, reciprocating motion at any desired speed, two double-acting pumps are employed together with their two steam cylinders, all seated firmly together in an iron casting called a cradle. The two steam cylinders are supplied with steam independently of each other; and the slide valve of each of them, which controls the admission and exit of the steam, is moved not by the action of its own piston rod, but by that of the other cylinder

der, with which it is connected by a rock shaft. By this arrangement, before the stroke of one cylinder is completed its piston rod opens the valve of the other cylinder, and a continuous motion is thus kept up. Each piston reposes for a perceptible interval at the termination of the stroke, during which quiet time the water valves drop to their seats by gravity, instead of being forced down as is usually the case by the return motion. The current of water in the supply pipe is moreover always unchecked, one chamber of the pump being ready to receive it before the other is shut off. The beneficial effect of this is to render the machine almost noiseless, removing all concussive action, together with the usual causes of rapid wear. The principle has been successfully applied to high pressure and condensing pumping engines of all sizes. The water works for supplying the city of Harrisburg, Penn., are furnished with pumps of this character, the working of which has proved very satisfactory.

PUMPKIN. See Gourd.

PUNCH, or Punchinello, a humorous character in a species of puppet show exhibited on the Italian stage and in the streets of European cities. The name is supposed to be a corruption of *Policinella* or *Pulcinella*, which in turn, according to Galiani in his *Vocabolario del dialetto Napolitano*, was derived from Puccio d'Aniello, a peasant, whose humorous eccentricities were in the 17th century transferred to the Neapolitan stage, where he has continued to be the medium of local and political satire, and a favorite conventional character in the Italian exhibitions of *fantoccini*, or puppet shows. The modern puppet show of "Punch and Judy" embodies a domestic tragedy followed by a supernatural retribution, the whole of which is treated in a broadly farcical manner. Punch himself is represented as a short obese personage, with an enormous hump on his back, a wide mouth, long chin, and hooked nose, and wearing a three-pointed cap. His wife Judy, who is in some respects his counterpart, and his dog Toby, are important characters in the performance.

PUNCH, or Punching Machine, a tool for striking holes in any thin material, as leather, iron, &c. In its simplest form it is a solid-pointed tool of steel, which is held in the hand and struck with a hammer. With this the blacksmith makes small holes in iron. For larger holes the punch is a circular hollow chisel, tapering to a sharp edge all around, and opening above in an annular space on each side through which the blanks or cylindrical bits cut from the material are discharged. Small punches for making holes in leather are fixed in one of the jaws of an instrument like pliers, and work against a copper disk attached to the opposite jaw. In an American improvement of this tool a set of 4 punches of different sizes are arranged in the form of a cross, and set so as to revolve in one of the jaws, either punch being brought into action as desired. For punching holes in the plates of steam boilers a great variety of powerful machines have been invented and are in use, some of which also combine the shearing of the plates with the punching. A very convenient portable punch for similar application is made of a bar of iron an inch thick and 4 or 5 inches wide, which is bent into the form of a horse shoe, and perforated in one of its ends for a screw, which at the outer end is square for the fitting on of a lever for turning it, and at the other end is pointed to act as a punch. On the face of the opposite jaw is set a steel ring or bed punch, and upon this is laid the edge of the boiler plate which is to be perforated. With this simple machine holes may readily be made of ¾ inch diameter in plates ⅝ inch thick; and it can be easily taken into the holds of steam ships or to work upon boilers in any situation.

PUNCTUATION, in grammar, the art of dividing a written or printed discourse into sentences and parts of sentences, for the purpose of indicating the mutual relations of the words, by means of points. The principal points used in English composition are the comma (,), semicolon (;), colon (:), period (.), note of interrogation (?), note of exclamation or admiration (!), dash (—), and parenthesis ( ). Of these, only the first four are marks of punctuation as the term is usually understood, or grammatical points indicating the length and character of the pauses to be made in reading. The others are mainly rhetorical or syntactical aids, regulating the modulation of the tone rather than the suspension of the voice; but the interrogation or exclamation point may take the place of either of the former, according to the structure of the sentence; and the dash partakes of both characteristics. The comma marks the smallest grammatical division in written or printed language. The semicolon separates such parts of a sentence as are somewhat less closely connected than those separated by a comma. The colon denotes a still longer pause than the semicolon. The period indicates the end of an assertive sentence which is independent of any that follows, and is also used after every abbreviated word, after headings, titles of books, &c., and generally after Roman numerals. The note of interrogation is placed after a question, and in Spanish is also placed inverted at the beginning of a question. The note of exclamation indicates an ardent wish, admiration, or other strong emotion, and is joined to interjections, words used as interjections, and clauses containing them; it is also duplicated in Spanish like the preceding. The dash is employed where a sentence breaks off abruptly and the subject is changed; where the sense is suspended, and is continued after a short interruption; where there is an unexpected or epigrammatic turn in the sentiment; after a long member, or series of phrases or clauses, leading to an important conclusion; before a word or phrase repeated in an exclamatory or emphatic manner—what elocutionists term an echo; where there is an ellipsis of such words as "namely" and "that is;" where there is an ellipsis of letters or figures, and in numerous other cases. Sometimes, as in this work, it is used instead of paragraphs. The parenthesis encloses a word or phrase introduced into the body of a sentence with which it has no grammatical connection.—Other marks in frequent use, and generally treated under the head of punctuation, though not strictly included in it, are the apostrophe ('), used to indicate the omission of a letter or letters, and also as a sign of the possessive case; the hyphen (-), placed between the constituent parts of a compound word, and at the end of a line when a word is divided; quotation marks (" "), placed at the beginning and end of extracted passages, of the speeches in dialogue, &c.; brackets or crotchets [ ], generally enclosing an explanatory phrase or passage inserted by one writer in a quotation from another; and references (consisting of the characters *, †, ‡, §, ‖, and ¶, called respectively asterisk or star, dagger, double dagger, section, parallel, and paragraph, or of figures or letters smaller than those of the text), pointing to notes correspondingly marked at the foot or margin of the page.—The ancients were in the habit of writing without distinction of either sentences or words until the 104th Olympiad. Afterward it became usual to place a mark of distinction at the end of every word, as in the following inscription found near Bath, England:

IVLIVS⊽ VITALIS⊽ FABRI, &c.

Sometimes, as in the subjoined extract from an inscription given by Montfaucon, a letter laid horizontally was used as an interstitial mark:

P. FERRARIVS HERMES
CAECINIAE ⊣ DIGNAE
CONIVGI ⊣ KARISSIMAE
NVMERIAE ⊣

There is reason to believe, however, that some system of punctuation was known to the Greeks in the time of Aristotle. It probably consisted of a single mark, which changed its signification according to a change of position. At the bottom of a letter (A.) it was equivalent to a comma; in the middle (A·), to a colon; and at the top (A˙), to a period; but this plan could only be followed as long as Greek manuscripts were written entirely in capitals. St. Jerome in his translation of the Scriptures used certain marks of distinction or division, which he called *commata* and *cola;* but it has been thought that they consisted simply in writing every clause on a separate line. The modern points came into use very gradually after the invention of printing, the comma, parenthesis, note of interrogation, and period being the earliest introduced, and the note of exclamation the last. The first printed books have only arbitrary marks here and there, and it was not until the 16th century that an approach was made to a regular system by the Manutii of Venice.

PUNDIT, or PANDIT (Pers. *pand*, learning), in Hindostan, a Brahmin who consecrates his life to the study and interpretation of the Vedas and Shastras, or all written law and knowledge. This word occurs in the Sanscrit, Hindostanee, and Persian languages, and is very nearly equivalent to doctor.

PUNJAUB (country of the five rivers), a territory of British India, occupying the N. W. extremity of Hindostan, and giving its name to a lieutenant-governorship lately formed out of the Punjaub and the Delhi division, including the districts of Paniput, Hurriana, Delhi, Rohtuk, Goorgaon, and the territories of Ferozepore, Loodiana, Umballa, and Kythul. The Punjaub proper is bounded N. by Koondooz, N. E. and E. by Little Thibet, Cashmere, and Ladakh; S. E. and S. by the North-Western provinces and Sinde, and W. and N. W. by Cabool; it extends from lat. 29° to 34° N., and from long. 71° to 7[illegible] E., and is of triangular shape, the sides being respectively 680 m., 630 m., and 500 m. long; area about 130,000 sq. m.; pop. 4,101,000. The chief towns are Lahore, the capital, Peshawur, Mooltan, Attock, and Dera-Ismael-Khan. The N. part is mountainous, being traversed by spurs of the Himalaya; but with these exceptions the surface is for the most part an extensive plain, gradually sloping from N. E. to S. W. in the direction of the 5 great rivers by which it is watered, which, uniting in the Punjnud, flow together to the Indus. These rivers are the Jhylum, Chenaub, Ravee, Beas, and Sutlej; they furnish an aggregate navigation of nearly 2,000 m., and divide the country into 5 districts or *doabs*. Gold is found in the sands of the Indus and Chenaub, and iron, plumbago, antimony, alum, and sulphur in the hill country; nitre is plentiful in the plains, and there are coal beds on the E. bank of the Indus.—The population is composed of various races, including Jats, Rajpoots, and Cathies, of Hindoo descent; about 250,000 Mohammedans, of Afghan descent; and Khalsas or Sikhs proper, who, though the dominant race, number less than a quarter of the inhabitants. The people are generally physically superior to those of other parts of Hindostan, and the Sikh soldiers are noted for bravery. The manufactures include silk and cotton goods and shawls of superior quality, second only to those of Cashmere; brocades, tissues, and carpets are also made; and firearms and swords of excellent temper were made in large quantities when the Sikhs ruled the country. An extensive trade is carried on with Cabool, Bokhara, Candahar, and different parts of central Asia. Public schools have been established for both sexes by the British, at which some 6 per cent. of the inhabitants receive instruction, exclusive of the private education which is general among the higher classes. The government under the present rulers resembles that established in the Bengal presidency. In 1849 the revenue was £1,560,000. Under the Sikhs the government was originally a sort of republic or confederation of *sirdars* or chiefs, all holding independent sway, and administering their own laws in their own districts.—Alexander the Great invaded the Punjaub. About A. D. 920 it was conquered by Mahmoud of Ghuznee, whose successors made Lahore the seat of their government. It afterward became subject to numerous chieftains, principally Afghans, who ruled it till the Mogul conquerors obtained possession of it in 1519. In 1748 it was overrun by the Afghans, to whom it was ceded by the Great Mogul in 1750. In 1768 the Sikhs made themselves masters of the territory E. of the Jhylum; and in 1809 Runjeet Singh conquered the greater part of the Punjaub, including the hill states, and afterward extended his authority over the whole of the country of the five rivers, and added Ladakh or Middle Thibet and Baltistan or Little Thibet to his dominions. In 1839 Runjeet was succeeded by his son Khurruk Singh, who died a few months afterward, when a period of anarchy followed, which ended in the Sikhs invading territory under the protection of the British. In 1845 were fought the battles known as those of the Sutlej, in which the Sikh forces were defeated with heavy loss, and the English took possession of the Punjaub and constituted themselves guardians of Dhuleep Singh, a minor, and grandson of Runjeet. In 1849 a conspiracy between several chiefs and the Afghans led to a second war with the English, in which the Sikh soldiers displayed their usual bravery, and their opponents suffered some heavy losses; but the result was the annexation of the Punjaub to the East India company's territory in March, 1849. In 1859 it was formed into a new lieutenant-governorship.

PUNTA ARENAS, the sole port of Costa Rica, on the gulf of Nicoya, established in 1847. As its name implies, it is situated on a sandy point projecting into the gulf. There is an outer and an inner harbor, the latter formed between the sand spit and the mainland, accessible only for vessels of very light draft. The former is an indifferent anchorage, protected by two islands from the swell of the Pacific. Vessels drawing more than 7 feet of water must anchor in the outer harbor 2 m. from the shore. The port is regarded as unhealthy, but not in the same degree as the other portions of the coast. The maritime commerce of the port for 1855 was as follows: vessels entered, 86; cleared, 67; value of exports and imports, $3,500,000. A good road leads from Punta Arenas to the capital of Costa Rica, San José, a distance of 75 m.

PUPA. See BUTTERFLY, and CHRYSALIS.

PURBACH, or PEURBACH, GEORG, a German astronomer, born at Peurbach, Austria, in 1423, died in Vienna in 1461. Having studied astronomy under Gmunden at the university of Vienna, he went to Italy to extend his knowledge of the science, and upon his return succeeded his master in the professorship at Vienna. At the time of his death he was reputed the first astronomer in Europe. He began a new edition of Ptolemy's *Almagest*, based upon the Latin translation from the Arabic; and though he neither understood Greek, in which the work was originally written, nor Arabic, his knowledge of astronomy enabled him to make his edition much better than previous ones. He left this work unfinished to his pupil Regiomontanus, who completed it. The most celebrated of Purbach's own works is his posthumous *Theoria Novæ Planetarum* (1488), which served as an introduction to Ptolemy, and as a text book.

PURCELL, HENRY, an English composer, born in London in 1658, died Nov. 21, 1695. He was the son of Henry Purcell, one of the gentlemen of the chapel royal, and probably received his first instructions in music from Capt. Cook, the master of the children of the chapel royal. Dr. Blow subsequently gave him a few lessons in composition, a circumstance considered of so much importance in the life of that musician that an inscription on his tomb specially mentions him as "master to the famous Mr. Henry Purcell." While a singing boy in the choir of the king's chapel, he composed several anthems still occasionally performed; and at the age of 18 he was appointed organist of Westminster abbey, a position which he resigned 6 years afterward to become one of the 3 organists of the chapel royal. He had previous to this time composed a number of anthems of great popularity; but notwithstanding his ecclesiastical training and occupations, his attention seems early to have been directed to secular and particularly to dramatic music. In 1677 he composed the music for an operetta by Tate, entitled "Dido and Æneas," performed by the pupils of a female boarding school. The success of this work encouraged him to become a regular writer for the stage, and for the play of "Abdelazar" (1677), for Shadwell's adaptation of "Timon of Athens" (1678), and Lee's "Theodosius" (1680), he composed the overtures and act tunes or pieces to be performed between the acts, and the incidental songs which it was then customary to introduce into plays. A number of these instrumental pieces in 4 parts were published by his widow in 1697, under the title of "A Collection of Ayres, composed for the Theatre and on other occasions, by the late Mr. Henry Purcell." Next in order of his compositions was a series of 12 sonatas for 2 violins and a bass published in 1683, and followed shortly afterward by another series of 10. Subsequent to this period he produced the greater part of his dramatic music, and an intimacy contracted between himself and Dryden led to his being employed to set the songs, dialogues, and choruses in several of the latter's most successful plays. In 1690 he composed new music for the "Tempest," as adapted for the stage by Dryden and Davenant, and within the next two years he similarly embellished Dryden's "King Arthur," "Indian Queen," and "Tyrannic Love." The first of these contains the duet, "Two daughters of this aged stream are we," and the charming song, "Fairest isle, all isles excelling."

The incantation scene in the "Indian Queen," commencing, "Ye twice ten hundred deities," in the opinion of Dr. Burney, opens with the best piece of recitative in the English language. For D'Urfey's 3 parts of "Don Quixote," produced in 1694–'6, he furnished perhaps the finest of all his dramatic compositions, the two songs, "Let the dreadful engines" and "From rosy bowers," the latter of which, it is said, was set in the author's last sickness. Within a few months before his death he also furnished the music for "Bonduca," a tragedy by Beaumont and Fletcher made into an opera by Dryden, and which the well known duet and chorus, "Britons, strike home," will preserve from oblivion. He also composed vocal pieces for Beaumont and Fletcher's "Diocletian," altered by Betterton, Dryden's "Aurungzebe," Shadwell's "Libertine," and other plays. In the "Fool's Preferment" occurs the song, "I'll sail upon the Dog Star," which Dr. Burney declares has all the fire of Handel's prime. The pieces above cited, together with the best of his detached and incidental songs, dialogues, and scenes, were published by his widow in 1697 under the title of "Orpheus Britannicus." His published anthems number 50, beside a celebrated *Te Deum* and *Jubilate*, with orchestral accompaniments; and his church music includes a complete service and a number of hymns and psalms. His odes, glees, catches, rounds, &c., were also numerous, and long held their popularity. Purcell died of consumption after an illness of some duration, and was buried in Westminster abbey. His dramatic compositions, on which his fame mainly rests, says Hogarth, "in variety of character, beauty of melody, truth and force of expression, and nice adaptation to the genius of the English language, are to this hour unparalleled. . . . . But the highest quality of his music is its genuine English character. In this respect it remains wholly unrivalled." For many years subsequent to the close of the last century Purcell's music was neglected or forgotten; but within the present century a revival both in the publication and the performance of it has been attempted with considerable success.

PURCHAS, Samuel, an English divine and author, born at Thaxted, Essex, in 1577, died about 1628. He was educated at St. John's college, Cambridge, and in 1604 was instituted to the vicarage of Eastwood in Essex. Removing to London, he received the rectory of St. Martin's Ludgate, and became chaplain to Archbishop Abbot. He compiled from more than 1,300 authorities a work entitled "Purchas his Pilgrimage, or Relations of the World, and the Religions observed in all Ages, and Places discovered, from the Creation unto this present" (1 vol. fol., 1613); and a collection of voyages under the title, "Purchas his Pilgrimmes" (4 vols. fol., 1625). The 3d and 4th volumes of this collection relate to America, and preserve the original narratives of the earliest English navigators and explorers of the western world. He also wrote "Microcosmus, or the History of Man" (1619), and "The King's Tower, and Triumphant Arch of London" (1623). It has been said that Purchas died in prison incarcerated for debts contracted in the publication of his "Pilgrimage" and "Pilgrims;" but this is denied by Wood, who says that he died in his own house.

PURGATORY, in the belief of the Roman Catholic church, a state of temporary suffering in the next world, where the souls of the just expiate the offences committed in this life. According to Catholic theologians, every sin, no matter how slight, deserves and will receive punishment either before or after death. The absolution of a priest in the sacrament of penance washes away the guilt of sin and remits the eternal punishment due for grave offences, but not the temporal penalty which has to be undergone as a satisfaction to God's justice. Baptism alone removes both the guilt and the penalty; and as few or no adult persons depart this life without having committed sins after baptism, there must be some middle state for such as do not deserve hell and are yet not pure enough to enter heaven. The church does not teach what is the nature and duration of the punishment of purgatory, nor that it is situated in any particular place. She believes that the sufferings of souls in the middle state may be abridged by indulgences, masses, and the prayers of their friends on earth; and one day in the year (All Souls' day, Oct. 2) is specially devoted to services and prayers for their benefit. The Greek church, like some of the eastern sects, prays for the dead, but does not believe in purgatory. Broughton has endeavored to prove that the notion of such a state was held by the Jews, pagans, and Mohammedans.

PURGSTALL, Hammer. See Hammer-Purgstall.

PURITAN, an epithet first applied in 1564 to English nonconformists, and which continued to designate them during the reigns of Elizabeth and the two first Stuarts. Such persons only as desired a wider separation from the Roman Catholic church than the established church of England seemed to afford them, and professed to follow the pure word of God, in opposition to traditions, human constitutions, and other authorities, were at first called puritans; but subsequently, says Sylvester, "the vicious multitude of the ungodly called all puritans that were strict and serious in a holy life, were they ever so conformable." In the latter part of Elizabeth's reign a portion of the nonconformists began to dispute the prevailing opinions concerning predestination, free will, and other doctrinal points, and under the arbitrary government of James I. and Charles I. all persons opposed to their maxims of government were classed as puritans; whence Hume has applied the name to three parties: the political puritans, who maintained the highest principles of civil liberty; the puritans in discipline, who were averse to the ceremonies and government of the established church;

and the doctrinal puritans, who rigidly defended the speculative system of the first reformers. Representatives from these three classes formed the bulk of the settlers of New England, and the union of them in the English civil wars effected the overthrow of royalty and the establishment of the commonwealth. At the time of the restoration the name became one of reproach, as implying an unreasonable degree of austerity in both temporal and spiritual matters. Since the relaxation in 1690 of the acts against the nonconformists, it has ceased to designate any particular religious sect. Of the Puritans who emigrated to North America, and whose influence has been so strongly manifested in the civilization of the continent, Bancroft says: "They were formal and precise in their manners; singular in the forms of their legislation; rigid in the observance of their principles. Every topic of the day found a place in their extemporaneous prayers, and in their long and frequent sermons. . . . . But these were only the outward forms which gave to the new sect its marked exterior. If from the outside peculiarities which so easily excite the sneer of the superficial observer, we look to the genius of the sect itself, Puritanism was religion struggling for the people."—The leading authority on the subject is Neal's "History of the Puritans" (edited by J. O. Choules, D.D., 2 vols. 8vo., New York).

PURKINJE, Johannes Evangelista, a German physiologist, born in Libochowitz, near Leitmeritz, Bohemia, Dec. 17, 1787. He was at first a monk of the order of the pious schools, then went to Prague to study medicine, and in 1819 became assistant professor of anatomy and physiology in that city, and in this position remained until 1823, when he went to Breslau as ordinary professor of physiology and pathology. In 1849 he returned to Prague. He has written numerous physiological works, and has also paid much attention to Slavic languages and literature.

PURPLE (Gr. πορφύρα; Lat. *purpura*), a color produced by the union of red and blue, and of various shades as one or the other of these predominates. The ancients esteemed it more highly than any other color, sometimes making it a distinctive badge of royalty, and again appropriating it to religious uses, as the decorations of the temple and the garments of the priests. In the Old Testament it is referred to in Exod. xxv. 4, xxxv. 6, xxxix. 29; 2 Chron. iii. 14; Jer. x. 9; Ezek. xxvii. 16, &c. It is however supposed that the purple of the Israelites was a scarlet, or even that the term was used generally for any color in which red predominated. The source of the true purple of the Greeks and Romans is noticed in the articles Buccinum and Murex; and in the article Mauve an account is given of the method of obtaining the beautiful and fixed purple dye known by that name, as practised by Mr. Perkins of England. The source of this color, recently introduced and now extensively used in dyeing and calico printing, is aniline, one of the products of the destructive distillation of bituminous coal. Other methods of treating the aniline, beside that of Mr. Perkins, are now employed for obtaining a color of this character. It is produced by adding acetic acid and bleaching powder to a saturated solution of aniline in water; and the shades are made to vary from blue to lilac by modifying the strength of the fluids employed. Aniline, in combination with acetic, sulphuric, or hydrochloric acid, is oxidized and made to produce the purple of various shades by treatment with different reagents, as peroxide of manganese, peroxide of lead, chloride of lime, or the green manganate of potash. By the last the purple color is precipitated and the liquid remains red. Silks and woollens absorb these purples without the use of mordants; but to dye or print vegetable fabrics with them mordants are required. In printing, the color is mixed with albumen and is finally fixed by steaming. Very fine purples of tolerably permanent character are also obtained from litmus. The so called "French purple" is produced by treating the lichens (which afford litmus) with an alkaline base, and precipitating from the filtered solution with an acid. The precipitate is moistened with sufficient ammonia to dissolve it. When boiled the solution is orange yellow, becoming red when exposed cold to the air. Heated in very shallow vessels to 100° to 140° F. it becomes violet, and will dye permanently silk or wool without mordants. By neutralizing the solution with an acid, a purple precipitate falls, which when separated and dried may be used for dyeing or printing. Various shades are obtained by combining with the precipitate carmine of indigo for violets, and carthamus or cochineal for reds.

PURPLE OF CASSIUS. See Cassius, Purple of.

PURSH, Frederic, an American botanist, born in Tobolsk, Siberia, in 1774, died in Montreal, Canada, June 11, 1820. He was educated at Dresden, came to America in 1799, and remained until 1811. In that year he visited England, where he pursued his studies, and in 1814 published at London an octavo volume entitled *Flora Americæ Septentrionalis*. Afterward he returned to America, and was engaged in the collection of materials for a flora of Canada when he died.

PURSLANE, the name of a succulent, fleshy, prostrate annual plant, formerly introduced into gardens for its use at table, but now seldom seen unless as a troublesome weed. There were several varieties, such as the golden, the green, and the white, which were carefully sown and cultivated as spinach is now. When fully grown, especially in a light rich soil, its stems and leaves are very palatable as boiled greens, and they have been used for pickling, or to garnish dishes. The common purslane (*portulaca oleracea*, Linn.) has an annual root, a stem 6 to 18 inches long, fleshy, smooth, spreading upon the ground, branching and rooting at intervals; the leaves thick and fleshy, half an inch long, alternate and opposite; flowers solitary, sessile, ephemeral; the calyx has 2 bluntly keeled sepals; the corolla has 5 petals of a pale yellow color; the seeds minute and numerous.—The common purslane represents the natural order *portulaceæ*, comprising both succulent herbs and shrubs with fleshy, entire, simple leaves, which are usually alternate, rarely opposite, and commonly destitute of stipules; the inflorescence terminal or axillary or solitary, and in spikes and panicles; the flowers regular, united, and usually short-lived; the fruit a 1-celled capsule, either opening longitudinally or transversely, and many-seeded, sometimes indehiscent and 1-seeded by abortion; placenta central; seeds albuminous, not winged, embryo curved. Several species of portulaca are known, chiefly natives of Asia and South America. The common purslane is supposed to have originated in the East Indies, though now extensively naturalized in Europe and America. Its properties are mild and harmless, though its seeds were once reputed anthelmintic. The *P. retusa* of Dr. Engelmann closely resembles it, and is found native west of the Mississippi. The hairy purslane (*P. pilosa*, Linn.) is a southern and western species, and native also of Mexico and South America. It is a low, diffuse plant, with lanceolate or linear leaves, having long tufts of hairs in their axils; flowers larger, crowded and sessile at the summit of the branches amid a dense tuft of hairs, with 5 purple petals and about 20 stamens. Several other species with terete leaves, pilose axils, and large showy flowers, have come into notice within a few years, and under floricultural care varieties of exceeding beauty have sprung from them; such are the *P. Gilliesii*, *grandiflora*, *Thellusonii*, *splendens*, &c., with crimson, purple, scarlet, rosy, white, yellow, striped, or variegated blossoms. They readily sow themselves after a year's cultivation, and will grow upon the driest and poorest soil, but flourish in the richer flower border, and are admirably adapted for bedding or sowing in large patches.—To this order belong the equally charming and interesting *calandrinia*, natives of the N. W. coast and California, with conspicuous purple flowers and thick glaucous foliage. The *talina* have low leafy stems, linear, cylindrical leaves, and cymes of purple flowers expanding for a single day. The terete-leaved talinum (*T. teretifolium*, Muhlenberg) is a pretty little plant occurring on rocks from Pennsylvania to the falls of St. Croix; it is capable of cultivation, and suited for rockwork where it can enjoy the full sunshine. The spring beauty (*Claytonia Virginica*, Linn.) is a perennial springing from a small tuber, has linear, elongated leaves, and rose-colored flowers of considerable size, from 6 to 15 in a loose raceme. It is a western and southern plant in rich moist woods, and grows well in the garden. There are 17 other species in North America, geographically distributed from New England to the pine woods near Fort Vancouver. The sea purslane (*sesuvium portulacastrum*, Linn.) and the *S. pentandrum* of Elliott are prostrate, maritime, succulent plants, with axillary or terminal apetalous flowers, and are found from the coast of New Jersey southward. The former has been employed for food as a substitute for New Zealand spinach.—The name purslane has been likewise applied to the euphorbias with which the true purslanes have no affinity; the spotted euphorbia or spotted spurge is called milk purslane, and another species bears the name of the black purslane, both common weeds by roadsides and in waste places.

PUSEY, Edward Bouverie, D.D., an English clergyman, born in 1800. He is the 2d son of the Hon. Philip Bouverie (who assumed the name of Pusey), younger brother of the first earl of Radnor. Having been graduated at Christchurch, Oxford, in 1822, he obtained a fellowship in Oriel college, took orders, and in 1828 became canon of Christchurch cathedral and regius professor of Hebrew in the university, a position which he still holds. He shares with Dr. Newman the reputation of originating the so called Anglo-Catholic movement in the church of England in 1833, which finds its best exponent in the celebrated Oxford "Tracts for the Times." Many of these, including an elaborate treatise on baptism, were written by Dr. Pusey, who also published letters in defence of his views to the archbishop of Canterbury and the bishops of Oxford and London. The characteristic tenets of the "Puseyite" party are judgment by works equally as by faith, baptismal regeneration, the apostolic succession of the clergy, the supreme authority of the church, the expediency of auricular confession and conventual establishments, and an efficacy in the sacraments of the church not inferior to that claimed exclusively by the Roman Catholic church. They aimed also at certain innovations in the ceremonies of public worship, and, in the words of the Rev. R. H. Froude, an ardent disciple of the party, wished "to unprotestantize the church," and called the reformation "a limb badly set, which required to be broken again." The agitation of these questions caused a violent controversy in the church of England, which has not yet died away. In 1843 Dr. Pusey preached a sermon before the university, in which he was understood to confess his belief in the doctrine of transubstantiation; and after an examination before a board of judges he was accordingly suspended from the office of preacher within the precincts of the university for 3 years. He was one of the editors of the "Library of Translations from the Fathers" and of the "Anglo-Catholic Library," and has adapted to the use of the church of England several Roman Catholic devotional works, and published sermons, treatises on the "Royal Supremacy in Spiritual Matters" and "The Ancient Doctrine of the Real Presence, gathered from the Fathers," and "Patience and Confidence the Strength of the Church" (1837). His most important work, the result of 50 years' study, "A Commentary on the Minor Prophets," is now publishing; 2 portions (Hosea—Amos, 4to., Oxford) have appeared (1861).

PUSHKIN, ALEXANDER SERGEIEVITCH, a Russian poet, born in St. Petersburg, May 26, 1799, died Feb. 10, 1837. He was educated at the imperial lyceum at Tzarskoe-selo, and on leaving it obtained an office at St. Petersburg in the department of foreign affairs; but having given offence to the government by his "Ode to Liberty" (1820), he was exiled from the capital and sent to fill a subordinate appointment under the governor-general of Odessa. The emperor Nicholas recalled him in 1825, and appointed him historiographer of Peter I., with an annual salary of 6,000 rubles. His acceptance of this position was regarded by the liberals as an abandonment of his principles. In 1829 he accompanied Field Marshal Paskevitch to Erzeroum. He died from a wound received in a duel. His first poem, "Ruslan and Lyudmila," was written at the age of 21; it is a story of the half fabulous time of Vladimir, and was from its first publication very successful. His *Plennik Kavkaskoi* ("Prisoner of the Caucasus," 1822) is a vigorous and somewhat fragmentary sketch of the escape of a young Russian captive from the Circassians. For his next poem, the "Fountain of Bakhchisserai," he received 3,000 rubles; it is a story not unlike "The Corsair" of Lord Byron. Between 1825 and 1828 appeared the various parts of "Eugene Onegin," a novel in verse, which is considered his masterpiece. His other works are: the "History of the Insurrection of Pugatcheff" (1827), written in discharge of his duty as historiographer; "The Gypsies" (1827) and "Poltowa" (1829), both narrative poems; "Boris Godunoff" (1829) and "The Stone Guest" (1826), dramatic poems; "The Captive's Daughter," a novel; and numerous tales and general miscellanies published in the *Sovremennik* ("Contemporary"), a quarterly miscellany, which he established in 1836. His "History of Peter the Great" was never finished.

PUSTULE, MALIGNANT, a specific disease, essentially septic and gangrenous, confined to the cutaneous tissue, and generally to those parts of the surface that are habitually uncovered. It appears most commonly on the face, and next on the hands, neck, and arms. It first appears in the form of a painful swelling, which, after a lapse of time varying from one to three days, rarely more, develops upon its central part a small reddish or purple spot, accompanied with itching. In the course of 12 or 15 hours more this spot changes into a bleb or vesicle, not usually larger than the head of a pin, containing a reddish brown or yellowish fluid. Owing to continued itching, the vesicle is ordinarily ruptured soon after its appearance; if otherwise, it dries up in about 36 hours, leaving the exposed dermis dry, and generally of a livid color. Itching now ceases; and, after a time varying from a few hours to a day, the centre of this discolored and denuded surface begins to grow hard and becomes surrounded by an inflamed areola covered with numerous small vesicles similar to the vesicle which first appeared. The middle of this areola is depressed, and the color varies from yellow to black. It is now hard in the centre and more painful than at any other stage. It is however a remarkable feature of malignant pustule that severe pain is generally absent; and this character, so different from all other acute inflammations of the skin, is a valuable negative diagnostic of the disease. During the next 24 or 48 hours the subcutaneous tissue becomes involved; the tumor strikes deeper and rapidly extends in all directions, yet it is so indurated as to be easily circumscribed, and its confines determined without difficulty. Meanwhile the central point, now of brown or livid hue, exceedingly hard and insensible, becomes gangrenous. If the disease ceases to make further progress, an inflamed circle of vivid redness now surrounds the gangrenous portion; the tumefaction, which had before rapidly extended, diminishes; and the patient experiences something like an agreeable warmth accompanied by a pulsatory motion of the affected part. The pulse, which had before grown irritable and feeble, revives; strength increases; if there has been some degree of fever, as occasionally happens, it is now resolved into a gentle perspiration; suppuration sets in between the living and the dead parts, and the detachment of the gangrenous portion leaves a suppurating surface of variable extent in different cases. Should the disease on the contrary tend to an unfavorable issue, generally no suppuration takes place; the gangrene spreads rapidly from the centre to the circumference of the tumor; the pulse becomes smaller and more contracted; the patient complains of extreme lassitude with inability to sleep, is attacked with fainting fits, and becomes passive as to the result; there is disinclination to take food or medicine, or have any thing done, and a total loss of appetite; the tongue is dry and brown; the features shrink; the skin is parched; the eyes are glassy; cardialgia and low delirium premonish the fatal termination. Such are in general the ordinary phenomena of malignant pustule, usually terminating in a period of time varying from 5 to 8 days. Exceptional fatal cases have been recorded however, varying from 24 hours to 16 days. In the suddenly fatal cases, the forces of the constitution are so quickly and entirely subverted by the malignancy of the disease, that few symptoms are manifested; the powers sink under it, as it were, without resistance. It is most fatal when attacking the face or neck. —Another variety of malignant pustule, which commonly attacks the hands or arms, is of a less regular character, in some cases presenting an appearance and running a course very similar to a circumscribed phlegmon, while in others it is exceedingly violent and fatal in a few hours, and in others still runs on for several weeks, and finally proves fatal rather from the effects of the disorder than from the disease itself. In the majority of these cases there is intense local pain in the affected part from the commencement, with enormous swelling and more or less redness. A small vesicle or pustule forms in the centre, and proceeds to take on a gangrenous character. Sometimes it becomes circumscribed and limits its action to the skin; but at other times numerous phlyctinæ cover the surface, and the destructive inflammation burrows into the cellular tissue which envelops the muscles, completely surrounding and disintegrating these organs, which become soft, black, and gangrenous. The blood vessels and nerves also become involved, and as a necessary consequence the death of the part ensues.—The pathology of malignant pustule is distinguished by a fluid state of the blood, which is usually very dark-colored; the texture of the heart is softened, and its surface covered with ecchymosed spots; the veins are sometimes softened and ecchymosed, and usually contain black or yellowish white clots of blood, of gelatinous consistence. The lungs are covered with superficial ecchymoses, presenting over their surface a number of deeply penetrating black spots, produced by local sanguineous infiltration. The inner coat of the stomach and intestines presents in different places, corresponding to the course of the vessels, prominent, dark-colored spots, formed by blood effused between the inner coats and the peritoneal covering. The villous coat of the stomach is also occasionally found ecchymosed; the liver and spleen are gorged with dark-colored blood, and the kidneys surrounded by emphysema.—*Causes.* It is the general conclusion of persons who have investigated the nature of malignant pustule, that the germ of the disease consists in an animal poison, usually contracted by man from cattle or their remains. In support of this view, it is found that as a general rule the disease most frequently occurs among knackers, tanners, veterinarians, persons engaged in the removal of offal, and stevedores, particularly those employed in handling hides from certain districts and countries where the diseases of cattle most prevail. In other cases it has been attributed to eating diseased animal food. Yet, strange as it may appear, in the whole scope of veterinary medicine no disease has been observed which accurately resembles the malignant pustule of man. Certain herbivorous animals, especially beasts of pasture, are subject to a disease called malignant carbuncle, characterized by the occurrence of a large uncircumscribed emphysematous tumor, which yields to pressure and crepitates under the fingers, and exhales a peculiar putrid odor. In its progress it turns black in the centre, and appears as if burned or charred; it is infiltrated with a yellowish colored fluid, and distended with a [illegible] gas. This disease is capable of being transmitted from one animal to another by inoculation, and by absorption to man, in whom it [illegible] a violent and dangerous course. MM. [illegible] and Manoury of France have vainly attempted to limit the term malignant pustule to [illegible] disease only. Malignant carbuncle and [illegible] ulcers which occur in cattle are the [illegible] tive symptoms of grave febrile disorders depending upon a diseased state of the blood and always consecutive to the febrile symptoms and the inoculation of man with matter from such an ulcer is only equally dangerous as the blood, and possibly the milk, of the same animal in the febrile state before the ulcer appeared. Indeed, cases have occurred where the blood of animals not previously known to have been diseased, has caused malignant pustule in man by absorption. It is the opinion of some observers that malignant pustule may occur spontaneously, without [illegible] contact with poisonous animal matter. [illegible] from the fact that diseased animal matter is known to cause the great majority of cases, many ways will readily suggest themselves [illegible] which inoculation might take place without any knowledge of the circumstance on the part of the person affected. A favorite dog or [illegible] (animals not subject to the disease) might [illegible] transport it; a butcher's knife or hook might convey the poison from diseased to otherwise healthy meat; or even a fly might carry on its tiny feet all that is necessary for a fatal inoculation. As a general rule, cattle which feed on prairie meadows are exempt from malignant disease; while those which are fed upon dried clover, lucern, and vetch, are peculiarly liable to carbuncle. The same may be said of cattle that are fed upon semi-decomposed grain, the refuse of distilleries and breweries. All such things are actively predisposing agents to the blood diseases of cattle, and liable to engender malignant pustule in man.—*Treatment.* Promote suppuration in the pustule as rapidly as possible, and sustain the constitution. To this end, as soon as the nature of tho disease is ascertained, the vesication formed on its surface should be opened, the fluid contents removed, and the denuded part covered with a dossil of lint dipped in a strong solution of muriate of antimony or other caustic. Six hours afterward this may be removed and a poultice applied; and 24 hours after this, if pain and burning heat have nearly or quite ceased, and no areola has formed, it may be safely concluded that the caustic has effectually permeated the whole of the diseased tissue, and that it will proceed to a healthy suppuration by the continued application of poultice. But if, on the contrary, a hard and deep-seated painful tumor has formed around the primary seat of the vesicle, we may take it for granted at the disease is extending itself. The tumor ould be forthwith divided through its whole idth and depth by a crucial incision, the ganrenous parts removed if any have formed, and e nitrate of silver or fused potassa thoroughly plied to the freshly divided surfaces. This roceeding is equally requisite when the slough hich forms on the centre quickly becomes rd and impermeable, like a piece of dry de; this must be removed to admit of the nimpeded action of the caustic. Scarifications nd cauterizations, with the continued applicaion of poultice, should be repeated daily until ppuration is established, or until the extent f the pustule is clearly defined. Internally, he bowels being first cleared by a mild catharic, quinia (4 or 5 grains every 3 or 4 hours), ith wine or brandy, and as much food as the atient can be induced to take (there being enerally disinclination to take food), and opites with camphor, as much as may be necesary to allay pain and produce sleep, constitute he basis of treatment. In spite of every ing, the peculiar contagion of malignant pusle, being in the blood, frequently proceeds traight on to a fatal termination; and this is ometimes the case even when the pustule eems to have been checked in its progress. On ecovery from malignant pustule, the deformties consequent upon its ravages sometimes equire surgical operations for their relief.—*istory.* Malignant pustule was not unknown o the ancients. Celsus and Paulus Ægineta oth described it under the head of carbuncle. Ambroise Paré, in the 16th century, distinuished it from plague. Yet it was not until he latter part of the 18th century that phyicians began to appreciate its nature. Thonassin, Boyer, Fournier, Montfiels, Veson, Sanerotte, Chambon, and especially Enaux and haussier, contributed to make the medical world acquainted with the nature of malignant ustule. During the present century, Bayle, Bidault, Villiers, Reynier, Rayer, Branell, Wager, Raimbert, Manoury, and Salmon, and reently Bourgeois and Gaujot, have given valuale monographs of cases and epidemics. In he United States, it has at least twice preailed epidemically—in the vicinity of Philaelphia in 1834–'6, and in Louisiana in 1837–'9. It is also said to have prevailed in Louisiana at n earlier period, soon after its settlement by he French. It is not known to have occurred in the northern portion of the United States otherwise than sporadically; unless, possibly, he "malignant erysipelas" which prevailed in he northern part of the state of New York in 1825 was a variety of malignant pustule; it was immediately preceded by a fatal epizootic of slavers among horses. In the same region, and just subsequent to an epizootic mong horned cattle in 1842, there were several cases of genuine malignant pustule, yet no one seems to have recognized its source. Since hat time, and it may be added since the commion practice of feeding cattle on the refuse of distilleries and breweries, and the more general spread of epizootic diseases, particularly in the northern part of the United States, malignant pustule has become a more common disease. Both of the epidemics above referred to were in conjunction with epizootics. Essays have been published in the United States by Drs. W. M. Carpenter, C. W. Pennock, J. H. Baldridge, and Wainwright; and sporadic cases have been described by Drs. E. D. Ayres, J. B. Wilkinson, Pierson, A. N. Bell, D. C. Enos, C. E. Isaacs, D. Dana, E. M. Snow, S. B. Wells, J. J. Ellis, and J. F. Noyes.

PUTNAM, the name of counties in 9 of the United States. I. A S. E. co. of N. Y., bordered W. by the Hudson river, E. by Connecticut, and watered by Croton river and Peekskill creek; area, 234 sq. m.; pop. in 1860, 14,002. Its surface is mountainous, a number of ranges crossing the county from S. W. to N. E., and the deep valleys which lie between are fertile. There are several beautiful mountain lakes, the principal of which are Mahopac, Canopus, and Gleneida. Iron, granite, limestone, and other minerals are found in the mountains, and there are many mines and quarries, some in operation and others that have been abandoned. It contains the West Point foundery, in the village of Cold Spring, one of the most extensive establishments of the kind in the United States. The works consist of a moulding house with 3 cupola furnaces, a gun foundery with 3 air furnaces, 2 boring mills, and several shops connected with them. From 400 to 600 men are employed. The productions in 1855 were 224,259 bushels of wheat, 64,504 of potatoes, 27,158 of apples, and 493,696 lbs. of butter. There were 31 churches, and 4,976 pupils attending public schools. It is traversed by the Hudson river and the New York and Harlem railroads. Capital, Carmel. II. A W. co. of Va., touching the Ohio with its W. corner, intersected by the Great Kanawha, and drained by its tributaries; area, about 350 sq. m.; pop. in 1860, 6,301, of whom 580 were slaves. It has a rough and hilly surface and a generally fertile soil, and contains extensive beds of iron ore and bituminous coal. The productions in 1850 were 249,040 bushels of Indian corn, 50,079 of oats, 14,373 of wheat, 37,122 lbs. of tobacco, 10,468 of wool, and 59,862 of butter. There were 6 grist mills, 8 saw mills, and 13 churches. Value of real estate in 1856, $1,048,982, showing an increase since 1850 of 46 per cent. Capital, Winfield. III. A central co. of Ga., bordered E. by the Oconee, and drained by Little river and several creeks; area, about 350 sq. m.; pop. in 1860, 10,130, of whom 7,142 were slaves. It has a nearly level surface, abounding with forests of oak and pine, and a soil naturally fertile. The productions in 1850 were 392,821 bushels of Indian corn, 45,205 of oats, 63,089 of sweet potatoes, and 8,621 bales of cotton. There were 1 cotton factory, 8 grist mills, 6 saw mills, 4 tanneries, 12 churches, and 197 pupils attending public schools. Capital, Eatonton. IV. An E. co. of Fla., bounded S. by St. John's river, and drained by its tributaries; area, about 450 sq. m.; pop. in 1850, 687; in 1860, 2,712, of whom 1,047 were slaves. Its surface is low and level and soil fertile. The productions in 1850 were 4,610 bushels of Indian corn, 32 bales of cotton, 74 hogsheads of sugar, and 7,030 gallons of molasses. Capital, Pilatka. V. A N. co. of Tenn., drained by affluents of Cumberland river; area, about 500 sq. m.; pop. in 1860, 8,558, of whom 682 were slaves. It has a hilly surface, and much of it is covered by forests. It has been recently formed from Jackson and White counties. Capital, Monticello. VI. A N. W. co. of Ohio, drained by Auglaize river and its tributaries, the Ottawa and Blanchard's fork; area, about 400 sq. m.; pop. in 1860, 12,808. It has a level surface, is covered with large tracts of timber, and its soil is fertile. The productions in 1860 were 189,165 bushels of Indian corn, 68,853 of wheat, 31,723 of oats, 4,478 tons of hay, and 15,123 lbs. of wool. There were 2 grist mills, 7 saw mills, 11 churches, and 3,068 pupils attending public schools. It is intersected by the Dayton and Michigan railroad. Capital, Kalida. VII. A W. co. of Ind., drained by a branch of Eel river and several creeks; area, 486 sq. m.; pop. in 1860, 20,729. It has an undulating surface and fertile soil. The productions in 1850 were 1,813,209 bushels of Indian corn, 82,965 of wheat, 81,423 of oats, 5,015 tons of hay, and 85,837 lbs. of wool. There were 10 grist mills, 11 saw mills, 9 newspapers, 62 churches, and 4,311 pupils attending public schools. It is intersected by the Indiana and Illinois canal, and the Indianapolis and Terre Haute and the New Albany and Salem railroads, both of which pass through the capital, Greencastle. VIII. A N. co. of Ill., intersected by the Illinois river and drained by its branches; area, 200 sq. m.; pop. in 1860, 5,587. It has an undulating surface and fertile soil. The productions in 1850 were 279,260 bushels of Indian corn, 88,771 of wheat, 29,671 of oats, 8,732 tons of hay, 10,774 lbs. of wool, and 48,494 of butter. There were 6 grist mills, 8 saw mills, 8 churches, and 880 pupils attending public schools. It is intersected by the Illinois central railroad. Capital, Hennepin. IX. A N. co. of Mo., bordering on Iowa, bounded E. by the Chariton river and drained by its branches; area, about 300 sq. m.; pop. in 1860, 9,208, of whom 31 were slaves. It has an undulating surface, diversified by prairies and forests, and a fertile soil. The productions in 1850, since which its population has very largely increased, were 49,940 bushels of Indian corn, 680 of wheat, 2,020 of oats, 2,208 lbs. of wool, and 9,843 of butter. There were 200 pupils attending public schools. Capital, Putnamville.

PUTNAM, Israel, an American general in the revolutionary war, born in the part of Salem now constituting the town of Danvers, Mass., Jan. 7, 1718, died in Brooklyn, Conn., May 19, 1790. He was the 11th in a family of 12 children, and in his boyhood was noted for his physical strength and bravery; but his literary advantages were not great, nor were the few he possessed very zealously improved. As soon as he was out of his minority he removed to Pomfret, Conn., where he bought a farm. Here occurred the famous encounter with the she wolf, which made the name of Putnam at once well known throughout the country. This animal had for years ravaged the property of the farmers in that region, and in one night had destroyed 70 sheep and goats from Putnam's flock. A strong party of the residents of the neighborhood at last resolved to continue the pursuit of the wolf until she had been killed. Having followed her tracks over the snow for 40 miles to the banks of the Connecticut, and then back again to Pomfret, they discovered her den, and spent the whole day in fruitless efforts to suffocate the enemy with burning sulphur, straw, and brushwood. The dogs were repeatedly sent into the cave, and returned wounded and dismayed. Putnam now declared his purpose of destroying the beast at whatever cost. The entrance to the cavern was about 3 feet wide and 2 feet high, and the passage continued of about the same dimensions for 30 or 40 feet. Providing himself with a torch of birch bark, and stripping off his coat and vest, Putnam next fastened a rope about his legs, in order that he might be drawn out at a given signal, and crept slowly in until he discovered at the further extremity the glaring eyes of the wolf, whose growls had been heard for some time. Having made a thorough survey of the situation, he gave the signal to his friends, who drew him forth with such celerity that the few clothes he had on were torn to rags and his skin severely lacerated. He then loaded his musket with 9 buckshot, and with torch and gun reëntered the den, and adjusted himself for the onset of the animal, which, howling, rolling her eyes, and lashing her tail, lowered her head to spring. At this instant, aiming at the eyes of the wolf, he fired, and was instantly drawn out, stunned by the shock and half suffocated by the smoke. After an interval of rest he loaded again, entered for the third time, and seeing the wolf prostrate on the floor of the cave applied the torch to her nose. Perceiving that she was dead, he seized her by the ears, again gave the signal, and the hero and the victim were drawn forth together. This adventure took place when Putnam was 25 years old. The 12 following years were spent in the pursuit of his calling, and with such success that when he entered the military service he was enabled to leave his family well provided for in case of his death. In 1755 he was appointed by the legislature a captain in Col. Lyman's regiment, and formed a strong company from among his neighbors, who were employed chiefly on special service as rangers. His first expedition was under Sir William Johnson against Crown Point. In 1756 he

s reappointed under his old commander Ly-
o, and in 1757 the legislature of Connecticut
ve him the commission of major. Perhaps
e most important service rendered by him
ring that year was the saving of the powder
agazine of Fort Edward at the conflagration
the barracks. For an hour and a half he
ntended with the fire until it was conquered,
many weeks of suffering elapsed before he
covered from the injuries he received. In
58, to escape from a strong party of Indians,
was obliged with a few men to descend the
ls of the Hudson at Fort Miller in a bateau.
e savages with admiration beheld him un-
rmed by their balls steering his boat down
pids never before passed, and conceived him
be an especial favorite of the Great Spirit.
e same year, when returning to Fort Ed-
ard from an expedition to watch the enemy
the neighborhood of Ticonderoga, his corps
s surprised by a party of French and Indians,
d he himself captured and bound to a tree.
hile in this situation a battle between his
n party and the enemy raged around him
r an hour. The tree against which he was
ced was part of the time in the hottest fire.
French officer, passing by, struck him in the
w with the butt of his gun. An Indian
mused himself for some time hurling his toma-
wk into the trunk of the tree to satisfy him-
f how near he could come to the prisoner's
dy and yet miss it. At length the party of
ench and Indians were forced to retreat, but
rried with them their captive, whom the
vages determined to roast alive. He was
d to a tree, and the fire was already blazing
riously, when his life was saved by the inter-
ntion of the French commander, Molang.
e next day he was taken to Ticonderoga and
terward to Montreal, where among other
isoners he met Col. Peter Schuyler, through
hose intervention he was treated according
his military rank and suffered to be ex-
anged. In 1759, having meanwhile been
ised to the position of lieutenant-colonel, he
rved under Gen. Amherst. In 1762 he com-
anded a Connecticut regiment in the expedi-
on against Havana, which was successful in
e object designed, though large numbers of
oops were destroyed by the climate. In
64 Putnam, who had now received a com-
ission as colonel, at the head of 400 Connec-
ut men accompanied Col. Bradstreet to De-
oit in the Pontiac war. The Indians however
tired without a battle, and a treaty was made.
or some years afterward he kept an inn at
ooklyn, the capital of Windham county, and
ring the same period frequently represented
e town in the legislature. In 1773 he was
gaged in the expedition that went up the
ssissippi to survey a tract above Natchez
r settlement, but Putnam himself never de-
ved any advantage of consequence from the
dertaking. The revolutionary war was now
ening, and Putnam from the beginning em-
aced zealously the cause of the colonists. In
April, 1775, at the alarm occasioned by the battle of Lexington, he left his plough in the field, turned loose the oxen, and mounting his horse rode to Boston in one day, a distance of 65 miles. Learning that the British had retreated and were besieged in Boston by the gathering hosts of militia, he went to Hartford to meet with the legislature, of which he was a member. By that body he was elected brigadier-general, and returning home he promptly gathered and organized a regiment, and after drilling them for some days marched with his men to Cambridge. Arriving there, he was soon sought after by the British officers, who offered him a commission as major-general in the royal service and a large pecuniary compensation, both of which he indignantly rejected. In May, 1775, he led a battalion of 300 men to Noddle's island, now East Boston, and succeeded in burning a British schooner, capturing a sloop, killing and wounding 70 of the enemy, and bringing off several hundred sheep and neat cattle. It was in great measure through his wish to bring on a general engagement, while the spirit of the troops was high, that the determination was taken to fortify Bunker hill. In the battle known by that name he acted a conspicuous part. When Washington arrived at the camp to take command in July, 1775, he brought with him commissions from congress for four major-generals, one of whom was Putnam; and to him alone did he deliver his commission, the others being withheld on account of the general dissatisfaction attending these appointments. In March, 1776, Washington being about to take possession of Dorchester heights, Putnam was ordered to attack Boston with 4,000 men in case the enemy should attempt to dislodge the Americans. Soon after the evacuation of that city he was ordered to take command in New York. He participated in the disastrous battle of Long Island, Aug. 27, 1776, and afterward went to Philadelphia to prepare for the defence of that place against an expected attack. After completing the necessary fortifications, he was stationed at Crosswick and subsequently at Princeton, where he remained until May, 1777. In that month he was ordered to take command in the highlands of New York. While there he sent back the following famous reply to Sir Henry Clinton, who claimed a lieutenant of a tory regiment as an officer in the British service: "Edmund Palmer, an officer in the enemy's service, was taken as a spy lurking within our lines; he has been tried as a spy, condemned as a spy, and shall be executed as a spy, and the flag is ordered to depart immediately. Israel Putnam. P. S. He has been accordingly executed." In the summer of this year the British troops surprised and took Forts Montgomery and Clinton, and obliged Putnam to retire to Fishkill. Subsequently he was removed from his command in the highlands, as Washington says, "on account of the prejudices of the people," and the dissatisfaction of

Hamilton and other officers, and also from the fact that a court of inquiry had been ordered to investigate the causes of the loss of Forts Montgomery and Clinton. This court decided unanimously that no blame could be attributed to Putnam, who not long afterward was stationed in Connecticut. In March, 1779, a corps of 1,500 British troops under command of Tryon made an incursion into that state, and approached Horseneck, one of Putnam's outposts. To oppose him were 150 men with two pieces of artillery, and with these Putnam took his position on the brow of a steep hill. After exchanging shots, as he saw the enemy's dragoons were about to charge, he ordered his men to retire to a swamp inaccessible to cavalry. He himself was hotly pursued, and finding that the dragoons were gaining upon him, he rode down a steep declivity, receiving on his passage a ball through his hat. Riding on to Stamford, he called out the militia, and effecting a junction with his little party he hung upon the rear of Tryon in his retreat and took about 50 prisoners, whom he treated with a humanity customary on his part, but so unexpected that the British general sent him a letter of thanks. During the summer of 1779 Putnam held command of the Maryland, Pennsylvania, and Virginia troops in the highlands of New York, and, assisted by his cousin Rufus Putnam and others, completed the fortifications at West Point. This was his last campaign. After the army went into winter quarters he returned home, and on setting out again for camp was attacked on his way by paralysis of his left side. He then took up his residence on his farm in Brooklyn, and there remained until his death. He was of medium height, of great physical strength, and his personal daring was of the most marked character. "He dared to lead where any dared to follow," is the inscription upon his tombstone.

PUTNAM, Rufus, one of the pioneer settlers of the state of Ohio, born in Sutton, Mass., April 9, 1738, died in Marietta, O., May 1, 1824. At the age of 16 he was apprenticed to a millwright, but by his own unaided efforts he managed to acquire some education. In 1757 he enlisted as a private soldier in the war against the French, and with occasional intervals was in active service until the close of 1760, in the beginning of which year he was made ensign. The following years he spent in farming and building mills, with the exception of about 8 months in 1773, when he went on an exploring expedition to the newly created government of West Florida. In 1775 he entered the continental army as lieutenant-colonel, was employed chiefly in the engineer department, and in 1776 was appointed by congress engineer with the rank of colonel. In 1777 he resigned his position as engineer, becoming colonel of a regiment in the Massachusetts line; in 1778 superintended the construction of the fortifications at West Point; and in Jan. 1783 received a commission as brigadier-general. In 1782 he had bought and removed his family to fiscated estate of Col. Murray in Rutla there lived for some years, serving as of the legislature and engaged in supe ing surveys ordered by the state of Ma setts and by congress. Early in 17 junction with Benjamin Tupper, he p a notice to the officers and soldiers of war, that from personal inspection he w isfied that the land in the Ohio country a much better quality than that of N land, and that with others he had dete to form a settlement there, and invited wished to do the same in the several of Massachusetts to send delegates to B A convention accordingly met in that March 1, over which Putnam presided, a Ohio company was formed. At a sub meeting 3 directors, of whom he was one appointed to make application to congress private purchase of lands, and the com procured from that body 1,500,000 acres rate of 66⅔ cts. an acre, although in they became possessed of somewhat le 1,000,000. A city was projected in th at the confluence of the Muskingum an rivers, and Putnam was intrusted with perintendence of the survey. On April he landed at the mouth of the Muskingu laid out the city of Marietta, the first nent settlement made in Ohio. From th he took an active interest in every thing lated to strengthen the infant colony a velop the resources of the country. On 9, 1788, he presided over the first court o eral quarter sessions which sat in that On March 31, 1790, he was made a ju and over the territory of the United Sta W. of the Ohio, and in 1796 was app surveyor-general of United States lands held the office until removed by Jeffers 1803. In May, 1792, he was also creat brigadier-general in the U. S. army, and commissioned to make a treaty with the tribes on the Wabash river. The foll year he resigned his commission in the as his health did not permit him to enga active service. In 1803 he was elected a ber from Washington county of the conv which on Nov. 29 of that year formed the constitution at Chillicothe.

PUTREFACTION (Lat. *putreo*, to be rot and *facio*, to make), the spontaneous deco sition of nitrogenous bodies, accompanied the evolution of fetid gases. The process sometimes treated as a variety of fermenta and called the putrefactive fermentation; it differs from fermentation, as ordinarily un stood, in commencing and continuing wi the addition of any other substance alread a state of decomposition. Putrefiable sub ces, when used to induce in other bodies change taking place in themselves, are term ferments. Putrefaction is either limited those organic substances which contain ni gen, or, if it occurs in others, is unattended ose noxious exhalations which most strikingly characterize the process. Vegetable sub- ances which contain much nitrogen, as the uciform plants, are subject to this change, but nimal matters of an albuminous character dis- lay its phenomena in the most marked degree. lesh, blood, milk, cheese, and wheaten flour the moist condition of dough and bread, hen exposed to an atmosphere moderately arm and damp, soon begin to experience a ovement in the molecules of their elements, nd new combinations of great variety are pro- uced, both liquid and gaseous. The active gent in this movement is the oxygen of the ir. It seizes upon some of the elements of he unstable compounds, and, breaking up the rrangements in which they were loosely held, ives rise to a multitude of new mixtures, some f them of extremely evanescent character, xisting only as stages in the progress of the lements back from their complicated organic ombinations to the simpler and more perma- ent inorganic compounds. The most conspic- uous among these products are the noisome aseous compounds of sulphur, hydrogen, phos- horus, ammonia, and carbon; carbonic acid lso is largely produced, and a variety of or- anic acids. Beside these are principles not ecognizable by their chemical reactions, but hose presence is made known by their terri- ly virulent effects upon the human system. uch are the poisons developed in animal bod- s within a few hours after death induced by isease, and retained within the tissues and uids during the continuance of putrefaction. he effluvia are also often extremely noxious nd infectious, but for the most part their effects re easily neutralized by chlorine or other dis- nfectants. The process of putrefaction may e checked in various ways, as by perfect ex- lusion of oxygen or air. The presence of wa- er or moisture being essential to it, the rapid emoval of this either by heat or absorption revents its initiation or continuance. At a emperature as low as the freezing point the hemical changes cease to take place, the ingre- ients remain unaltered for any length of time, nd when by the rise of temperature they are gain set free, putrefaction may ensue. The emperature of boiling water arrests putrefac- ion by coagulating the albumen; and at still ower degrees, even to 100° F., it is doubtful whether the true putrefactive process goes on. A great variety of antiseptics or antiputrefac- ive compounds are employed to arrest decay, ome of which, as salt, sugar, alcohol, &c., derive their efficacy chiefly from their property of absorbing moisture, and others from their forming with the organic ingredients combinations of a more stable character. This branch of the subject is further treated in the articles Antiseptics and Preservation of Food.

PUTTY, a composition of whiting and linseed oil worked by hand into a doughy mass, and then beaten with a mallet until it becomes of uniform consistency. It is used by glaziers to secure panes of glass in the sashes, and by carpenters for stopping holes in their work.

PUTTY POWDER, a preparation of the oxides of tin and lead used for polishing glass, mineral, and metallic surfaces. The best kinds contain the least oxide of lead; the poorest consist of this chiefly, and are prepared by the process described in the article Litharge. The lumps of oxide obtained are ground to powder and sifted. They are of various colors. That preferred by opticians and marble workers is a heavy white powder; it is the smoothest and at the same time the most cutting. A pure oxide of tin, superior to any other sort of polishing putty, is prepared by dissolving metallic tin in diluted *aqua regia*, and after filtering causing the oxide to be precipitated by ammonia. It is then collected, washed with water, and pressed dry in a cloth filter. The mass is broken up, dried in the air, levigated on a glass plate, and then heated in a crucible to a low white heat. The fine particles thus assume crystalline forms with cutting edges.

PUY, Le (anc. *Anicium Vellavorum*), a town of France, capital of the department of Haute-Loire, 270 m. S. S. E. from Paris; pop. in 1856, 14,428. It is one of the most picturesque towns of France, being situated at the junction of the valleys of the Loire, Borne, and Dolaison, and built in the form of an amphitheatre upon the steep southern acclivity of Mont Anis, which is crowned by a mass of volcanic rock with a flat top, called Rocher de Corneille. The Borne is crossed by a bridge, near which is the Rocher de St. Michel, a remarkable conical rock rising to the height of 265 feet above the stream. The Rocher de Corneille has on its summit a colossal statue of the Virgin, cast from cannon captured at Sebastopol in 1855, and the Rocher de St. Michel an old chapel in the Romanesque style. The principal part of the town occupies a series of terraces upon which the houses rise one above another, and the streets in many places are impracticable for wheeled conveyances. The cathedral is a Gothic structure of the 10th century, standing in a very conspicuous situation, and reached by a stairway of 118 steps. The manufactures consist of lace, woollen goods, leather, and nails; and there are also fulling mills, dye works, and a bell foundery. It is a place of great antiquity, and during the middle ages several ecclesiastical councils were held in it.

PUY-DE-DOME, a S. E. department of France, in the old province of Auvergne, bounded N. by the department of Allier, E. by Loire, S. by Haute-Loire and Cantal, and W. by Corrèze and Creuse; area, 3,070 sq. m.; pop. in 1856, 590,062. It is divided into 5 arrondissements, and Clermont is the capital. With the exception of a small part of the S. W., which is drained by tributaries of the Garonne, the waters of the department flow to the Allier, which traverses it in a N. and S. direction and belongs to the valley of the Loire. The surface consists of an undulating basin, called the valley of Limagne, with a general inclination toward the N. The mountains of Forez, an offset of the Cévennes, bound the valley on the E., and are covered with pine forests interspersed with some poor pastures, and a few patches of oats and rye. The W. limit is formed by a portion of the Auvergne mountains, here divided into two principal groups, that to the N. being known as the Monts Dômes and that in the opposite direction as the Monts Dores. The most elevated point in the first of these groups is Puy-de-Dôme, from which the department takes its name, and of the last Puy-de-Sancy, the highest mountain in the interior of France, which are respectively 4,846 and 6,225 feet above the sea. These mountains are all of volcanic origin, and many of the extinct craters and the course of the lava which flowed from them are plainly visible. Mineral springs are numerous, and traces of many metals are found, but the only mines worked are lead, antimony, and coal. The soil of the Limagne is fertile; the hillsides are covered with orchards and vineyards; there are extensive chestnut plantations, and the forests contain pine, oak, and beech. The manufactures of the department are not very important. Puy-de-Dôme forms the see of the bishop of Clermont, has numerous schools, and returns 6 members to the legislative chamber of the empire.

PYAT, Félix, a French journalist, dramatist, and politician, born in Vierzon, department of Cher, Oct. 4, 1810. He studied law in Paris, and was admitted to the bar in 1831, but gave up his profession to devote himself entirely to literature and politics. He contributed to *Figaro*, the *Charivari*, the *Revue de Paris*, *Artiste*, *Livre des cent-et-un*, *Paris révolutionnaire*, and *Salmigondis;* furnished Jules Janin with one of the most striking chapters of his *Barnave;* and was connected as *feuilletoniste* with the *Siècle*, and afterward for several years as political editor with the *National*. His first play, which he composed in conjunction with his friend Théodore Burette, *Une révolution d'autrefois*, was brought out at the Odeon, March 1, 1832, but was suppressed at once on account of its bold political allusions. *Une conjuration d'autrefois*, printed in 1833 in the *Revue des deux mondes*, and *Arabella*, in which, under assumed names, he branded the supposed accomplices in the death of the duke of Bourbon, were of a similar political character. In conjunction with Luchet, he produced in 1834 *Le brigand et le philosophe*, and in 1835 *Ango*. Politics now engaged his attention for about 6 years. Returning to the drama in 1841, his *Deux serruriers* had an extraordinary run; and his *Cedric le Norvégien* (1842), *Diogène* (1846), and *Le chiffonnier* (1847), his last play, were also successful. In 1844, for a violent pamphlet, *Marie Joseph Chénier et le prince des critiques*, against his former friend Jules Janin, he was sentenced to 6 months' imprisonment. He left the *National* for the more revolutionary *Réforme*, and on the proclamation of the republic in 1848 sided with the soc Elected to the constituent assembly, h came one of its secretaries, and voted w party of the mountain. After his re in 1849, he signed Ledru-Rollin's "Ap Arms," June 13, accompanied him to th *servatoire des arts et métiers*, and mak escape first took refuge in Switzerl then removed to Belgium, where he occ ally wrote political pamphlets in the f letters to the count de Chambord, Bar prince de Joinville, the president of the F republic, &c. He became connected w "European revolutionary committee," last pamphlet was an apology for the a to assassinate Napoleon III. He is one of who refused to profit by the amnesty g by the emperor in 1859.

PYGMALION, in Greek legendary hi a king of Cyprus, whom the licentious co of his countrywomen so disgusted that he ceived a hatred against the whole sex. cording to Ovid, he made an ivory f statue of such exceeding beauty that h desperately in love with it himself, and p to Venus to endow it with life. The g granted his request. Pygmalion then m the object of his affections, and by her son called Paphus, who founded the ci that name. Rousseau's musical play of *malion* is founded upon this legend.

PYLOS, the name of 3 towns of an Greece, one of which was situated in another in Triphylia, and the third and important in Messenia, on the promont Coryphasium. The last was probably the los spoken of in the poems of Homer as residence of Nestor. The earlier city on promontory was forsaken by the inhab after the close of the second Messenian and the promontory remained deserted the Peloponnesian war, when in 424 B. was taken possession of and fortified b Athenian general Demosthenes. It be memorable for the defeat of the Spartans long after, but at the close of the war p again into the hands of the Lacedæmon The modern city of Navarino is situated the site of the old town.

PYM, John, an English patriot and or born at Brymmore, Somersetshire, in 1584. in London, Dec. 8, 1643. He was of a family, and was educated at Pembroke col Oxford, but left without taking his degree. applied himself to the study of common la one of the inns of court. He became a c in the office of the exchequer, entered pa liament in 1614, and in 1620 became consp ous as a leader of the country party. In he was one of the 12 commissioners sen James I. at Newmarket in behalf of the p ileges of parliament, and at the close of year was sentenced with Coke, Philips, Mallory to imprisonment for his oppo to the measures of the court. In the first liament of Charles I. he was indefatigabl

support of the rights of the people, and in
26 was one of the managers of the articles
impeachment against the duke of Bucking-
m. In 1639 he held communications with
commissioners sent to London by the
otch Covenanters, and accompanied Hamp-
n through the country to incite the people
send in petitions. In the short parliament
1640 he was one of the most active mem-
rs, and in the long parliament exerted great
luence not only by his eloquence and knowl-
ge of common law, but by his zeal in re-
icting the royal authority. At the opening
the session he made a speech upon griev-
nces, as regarded the privileges of parliament,
ligion, and the liberty of the subject. On Nov.
he moved to impeach the earl of Strafford for
gh treason, and as one of the managers on
part of the house of commons he bore a
ominent part in the proceedings which led
the execution of that minister. In the sub-
quent trial of Laud he also made a violent
eech against the prisoner, and was the mover
the grand remonstrance, which enumerated
faults of the royal administration from the
ession of Charles. He was one of the 5
mbers of parliament whom the king attempt-
in person to seize; and after the departure
Charles from London, he assisted in carrying
the executive branch of the government.
t in 1643 he put forth a vindication of his
nduct in answer to the charges brought
inst him, from which it was thought doubt-
with which of the two parties then divid-
the kingdom he would go. In Nov. 1643,
was appointed lieutenant of the ordnance;
d dying not long after, he was buried in
stminster abbey "with wonderful pomp
d magnificence," 10 members of the house
commons carrying his bier. Pym was in re-
gious sentiment a strong Calvinist and zeal-
usly opposed to Arminianism. In consequence
his popularity and his influence he was nick-
med King Pym. "His parts," says Lord Clar-
don, "were rather acquired by industry than
pplied by nature or adorned by art; but beside
exact knowledge of the forms and orders
the house of commons, he had a very comely
d grave way of expressing himself, with great
ubility of words, natural and proper. He
derstood likewise the temper and affections
the kingdom as well as any man, and had
served the errors and mistakes in govern-
ent, and knew well how to make them ap-
ar greater than they were."

PYNAKER, Adam, a Dutch painter, born
Pynaker, between Delft and Schiedam, in
21, died in 1673. In his youth he resided
several years at Rome, where he acquired
ideal or pastoral style of landscape painting.
s pictures contain charming effects of sun-
ght, with clear, warm skies, and trees and
her natural objects are painted with a broad,
e pencil, and great richness of color. The
of his works are of cabinet size, and many
these are owned in England.

PYRAMID, in mathematics, a solid whose base is a plane figure of any number of sides, and whose other faces are plane triangles all terminating in a point above called the vertex. It is triangular, quadrangular, pentagonal, and so on, according as the figure of the base is triangular, quadrangular, pentagonal, &c. It is called right when, having for its base a regular polygon, a perpendicular from its vertex falls upon the centre of the polygon. It is called regular when it is bounded by 4 equal equilateral triangles, and is then known as a regular tetrahedron. The pyramid corresponds among plane solids to the cone among curve solids. As popularly understood, it is a solid whose base is a square and its faces isosceles triangles, or triangles having two equal sides.

PYRAMID, a structure in masonry, usually of a square base with sides meeting in a point at the top, much used among the earliest nations in different parts of the world, either as a sepulchral monument or for religious purposes. By reason of the simplicity of the figure such edifices were easily raised of the largest dimensions; and owing to their solidity, as well as the durability of the materials employed, they have stood longer than any other works of man. The most famous pyramids in the world are those of the ancient Egyptians, standing near the W. margin of the valley of the Nile, a few miles above Cairo, and found at short intervals usually in groups for some 60 or 70 m. further up the river, and not far back from it. As many as 60 have been counted, the ruins of many more are to be seen, and great numbers have without doubt disappeared in the long period of nearly 40 centuries since they were constructed. In the early Egyptian dynasties the capital, Memphis, stood about 10 m. above Cairo on the W. bank of the river. The burial places of the multitudes with which the valley was peopled were along the edge of the rocky tract known as the Libyan range, which intervenes between the cultivated lands of the Nile and the great desert, whose drifting sands now cover the region around the pyramids. In the rocks they excavated their tombs and built them up of the materials at hand, and over those designed for the king and probably other important personages they raised the pyramids, some of which from their vast size have ranked among the principal wonders of the world. From Cairo several groups are in full view. The nearest group is that of Ghizeh, consisting of three pyramids, two of which exceed all others in their dimensions. Beyond these are seen the three pyramids of Aboo Seer, then the great pyramid of Sakkarah, showing its construction in steps, and accompanied by several smaller pyramids. Some distance beyond these are discerned the two majestic pyramids of Dashoor, and others still appear yet further to the S. From the investigations which have been made to determine the character of these structures, it appears that they date from the period of the 3d dynasty to the

12th, after which the Egyptians ceased to build them. Each one was commenced over a sepulchral chamber excavated in the rock, and during the life of the king for whom it was intended the work of building up the structure over this chamber went on, a very narrow and low passage way being kept open as the courses of the stone were added, by which access from the outside was secured to the central chamber. At the death of the monarch the work ceased, and the last layers were then finished off and the passage way closed up. The piles were constructed of blocks of red or syenitic granite from the quarries of Asswan, and also of others of a hard calcareous stone from the quarries of Mokattam and Tourah. They were of extraordinary dimensions, and their transportation to the pyramids and adjustment in their proper places indicate a surprising degree of mechanical skill. Their thickness varied from more than 4 to less than 2 feet, and when arranged one upon another forming steps up the outer slopes, the thickness of the stones determined the height of these steps. Those near the top are of the thicker stones, but the blocks are of moderate length compared with those near the base. The foundations for the structures were excavated in the solid rock, sometimes to the depth of 10 feet, and upon this the great stones were arranged and built up layer upon layer, and one shell succeeding another, the spaces within being filled in with smaller stones closely packed. To quarry and move the immense blocks to the pyramids and then raise them to their places must have been a work calling in play no little engineering skill, notwithstanding an unlimited amount of human labor was at command. Near the summits however the number of men that could aid in raising the huge stones must have been comparatively small for want of room, and it seems that some mechanical power must have been employed beside any which we know they possessed. The probability of this is confirmed by the fact that cavities in the stones have been found, which appear as though they might have been worn by the foot of derricks turning in them. The 3 pyramids of the Memphis group stand upon a plateau about 137 feet above the level of the highest rise of the Nile, not far apart from each other, and nearly on a N. E. and S. W. line. Like the other pyramids of Egypt, their 4 sides are directed toward the cardinal points. The largest of them, known as the great pyramid, covers at present an area of between 12 and 13 acres, the side of its square measuring 746 ft.; and its height is 450 ft. 9 inches. Its dimensions have been reduced from a base of 764 ft. and a height of 480 ft. by the removal of the outer portions to furnish stone for the city of Cairo. Thus despoiled, the walls have lost their smooth finished surface, in which state they were left by their builders, who, commencing at the top, filled in with small stones the angles formed by the recession of each upper layer, and bevelled off the upper edges of the great blocks, till reaching th they left each side of an even surface s at an angle of 51° 50′. By stripping o outer casing the courses of stone appear form of steps, which, though ragged an equal, can be ascended even by ladies. great pyramid has 203 of these steps, th ones being 4 ft. 10 inches high. The hor surfaces were nicely finished, and the s were joined together with a cement o without sand. The structures are so nearly that the spaces occupied by the chamb passages are of little account in estimatin contents. Those of the great pyramid an to about 82,111,000 cubic feet of mason side about 7,000,000 more which have be moved, and the total weight of the st estimated at 6,316,000 tons. The only en is on the N. face, 49 ft. above the bas about 24 ft. E. of the central line. The m ry about it is much broken away, and the of broken stones reach up from the nearly to its level. A passage way, only 11 in. high and 3 ft. 5½ in. wide, leads f down a slope at an angle of 26° 41′ a dis of 320 ft. 10 in. to the original sepulchral ber, commonly known as the *subterr* apartment, and beyond this 52 ft. 9 in. in rock, with an area in this portion of only 7 in. in width and 2 ft. 8 in. in height. supposed that it was intended to excavat other chamber at the end of this passag that it was not done on account of the m continuing to live until it was found exp to close up the mouth of the passage wit external casing of masonry. The sep chamber is 46 ft. long by 27 ft. in widt its height is 11½ ft. The entrance passag ft. long, connects with a branch passage, w rises at an angle of 26° 18′, and thus ex 124 ft., when it becomes level and runs 1 further. This connects with several cham and passages, the position and nature of w cannot be described without the aid of illus ed plans. One of the former, situated ne in the central portion of the pyramid, and ft. above its base, is known as the qu chamber. This measures 17 ft. by 18 ft. 9 i and 20 ft. 8 in. high, and has a groined r It appears to have been intended for a sar agus; but the only one found was in wh called the grand or king's chamber. This is apartment lined with red granite highly p ished, single stones reaching from the floor the ceiling, and the ceiling is formed of 9 la slabs of polished granite, extending from w to wall. It is 34 ft. 3 in. long, 17 ft. 1 in. wi and 19 ft. 1 in. high. Over it are 5 sma chambers apparently built to shelter the larg room beneath from the weight of the masonry. The room is perfectly plain, and contains only a sarcophagus of red granite, which is 7½ ft. long, 3 ft. 3 in. wide, and 3 ft. 5 in. high, too large to have been introduced through the entrance passage, and must therefore have bee placed in the room when this was built. It is

pposed that it contained a wooden coffin with
mummy of the king, and that these long
ce disappeared when the pyramids were first
ened and plundered. In the construction of
e pyramids arrangements were made for
ooking up the important passages with huge
asses of granite, and the obstacles thus inter-
sed have greatly impeded their exploration,
d sometimes rendered it necessary to open
w passages past the obstructions. It is prob-
le that on account of these extraordinary pre-
utions there are yet undiscovered apartments
no little interest in the immense body of
ese structures. Notwithstanding they have
centuries been objects of great curiosity,
d have been visited, explored, and plundered
people of different nations, new apartments
ere discovered in 1835 by Col. Howard Vyse,
also hieroglyphics upon the stones, made by
quarrymen, and which when deciphered
oved to be the name and titles of the rul-
g monarch Shufu, the Cheops of Herodotus.
he second pyramid stands on a base 33 ft.
ove that of the great pyramid, and in an ex-
vation made for it in the rock. It measured
iginally 707 ft. 9 in. square, and 454 ft. 3 in.
gh; but these dimensions are now reduced
spectively to 690 ft. 9 in. and 447½ ft. The
gle of its slope is 52° 20′. The upper portion
its casing is still preserved, and persons can
cend this, though not without danger, espe-
lly if liable to become dizzy by losing sight
the lower portion of the structure. This
yramid has two entrances, one 37 ft. 9 in.
ove the base, and the other built out in front
the base, each leading by an inclined pas-
ge of about 100 feet in length to the same
pulchral chamber. This has a roof of the
ape of the pyramid itself, and measures 46
2 in. by 16 ft. 2 in., and is 19 ft. 3 in. high.
contains a granite sarcophagus 6 ft. 7 in.
ng, 3½ ft. wide, and 2 ft. high. It was
ached with great difficulty by Belzoni in
818, who found a Cufic inscription recording
he visit of the caliph Othman and the open-
g by him of the pyramid, A. D. 1196-'7.
he only remains met with were those of a
ll. The third pyramid is only 354½ ft. square
nd 203 ft. high. It was explored in 1837 by
l. Vyse, who discovered several apartments,
one of which were a highly finished sar-
ophagus, a mummy case, bearing the name
King Menkaré, and the body of a workman.
he last two are now in the British museum,
t the sarcophagus was lost on the passage.
his pyramid, though the smallest, is the best
onstructed of the three, and indeed the style
the work is more costly than that of any of
e other pyramids of Egypt. In the same
cinity are 9 smaller pyramids, supposed to
ave been the tombs of some of the relatives
the kings who constructed the larger pyra-
ids, and an immense number of tombs, some
uilt up above the surface, some excavated in
e rock, and some subterranean channels. Near
e great pyramids is also the famous sphinx,
a figure of a recumbent lion with the head of a man fashioned out of a projecting rocky ledge, 188 ft. 9 in. long. Some defective portions, as also the legs, are made up by masonry. In front are steps leading up to the sanctuary and tablets; but the drifting sands of the desert keep these mostly concealed. Of the other pyramids further S., the largest are of the Dashoor group, of which there are 5, 2 of stone and 3 of rough brick. One of the former is now reduced from 719½ to 700 ft. square, and from 342½ to 326½ ft. high, and the other is 616½ ft. square and 319½ ft. high.—The pyramids were described very particularly by Herodotus, to whom they were of great interest for their antiquity even in his time, and also as the most wonderful monuments of human labor. He states that the great pyramid was built by Cheops, who stopped all other works connected with religious rites, and compelled his people to the number of 100,000 at a time to labor in this undertaking, and at the end of 3 months their places were supplied by the same number of fresh hands. To facilitate the transportation of the stone from the Tourah quarries, a causeway was built 3,000 ft. long, 60 ft. wide, and 48 ft. high, which required 10 years for its completion. The subterranean chamber was in an artificial island formed by a canal brought up from the Nile. This seems improbable, considering the elevation of the ground, about 140 ft. above the highest rise of the river. The construction of the pyramid required, according to Herodotus, a further period of 20 years, and he describes the method of building by steps and raising the stones from layer to layer by machines, and finally of facing the external portion from the top down. Diodorus calls this monarch Chemmes or Chabryes, and Manetho and Eratosthenes call the builder of this pyramid Suphis or Saophis I. Pliny makes mention of the great pyramid and of persons ascending it in his day, though at that time the casing had not been removed. The builder of the 2d pyramid is said by Herodotus and Diodorus Siculus to have been the brother and successor of Cheops and named Cephren. The builder of the 3d pyramid was King Menkaré, variously given by different writers, the 3d king of the 4th dynasty. The date of these structures is thus not far from 2,500 B. C. When they were first explored in more recent times is not known; but it is suggested that they were rifled by Cambyses, who is spoken of by Herodotus (iii. 27) as having opened ancient sepulchres at Memphis. They were visited and described by Belminus, A. D. 1053; and more recently by numerous travellers, as Belzoni, Denon, the expedition accompanying the army of Napoleon, Salt, Caviglia, and Col. Howard Vyse, who spent a fortune in their exploration, aided by Perring. Many of the works in which they are described are referred to at the close of the article EGYPT, to which may be added as particularly relating to this sub-

ject Vyse's "Operations carried on at Ghizeh in 1837" (3 vols. 8vo., London, 1837 *et seq.*)—Pyramids are frequently met with in the upper part of the valley of the Nile. There are many in Nubia about lat. 17° and 18° N., the sepulchres of the monarchs of Meroë and of Ethiopia; a single group N. of Gebel Barkal comprises no fewer than 120. Others are met with in other ancient countries of the East. At Birs Nimroud is the step-shaped pyramid built by Nebuchadnezzar of bricks of different colors, known as the temple of seven spheres, for an account of which see BELUS, TEMPLE OF. This was 235 ft. high with a perimeter of 2,286 ft. The same monarch built the pyramidal brick structure of Mujellibe at Babylon, the ruins of which still remain. At Benares in India are also the ruins of pyramids; and others were built in ancient times at Peking, and again at Suka in Java. At Rome one was constructed 20 or 30 years B. C., in honor of C. Certius; an imitation of the Egyptian monuments, and furnished with a sepulchral chamber. It is 120 ft. high on a base of 95 ft. diameter, built of hewn stone and marble-faced.—In Mexico are similar structures far exceeding in the area they cover the dimensions even of the great pyramid of Egypt. The principal one of these is described in the article CHOLULA. The two pyramids of Teotihuacan, in the same country, are situated in the centre of the plain of Otumba, 7 leagues N. E. of the city of Mexico, and called respectively *tonatiuh itzaqual*, and *metzli itzaqual*, or "houses of the sun and moon." The first named is of 4 stages, 680 ft. square at its base, 221 ft. in vertical height, with a level area at its summit, where was anciently a great statue of the sun. The house of the moon is 144 ft. high, with relatively small base, but with the same number of stages. They seem to have been built of sun-dried bricks, faced with stone, and finally covered with a layer several inches thick of a close and hard cement. The lesser pyramid contains a number of chambers, reached by an adit which enters on the S. side between the 2d and 3d terraces, and descends at an angle of 30°, almost precisely as in the case of the great Egyptian pyramid of Ghizeh. The sides of these pyramids coincide with the cardinal points. A great number of smaller pyramidal structures or mounds are scattered over the plain around them, some of which are ranged in squares, and others in parallel lines, constituting what the Mexicans called *micoatl* or "path of the dead." It has been conjectured from this name, that this was a general burial place of the distinguished dead among the people who built the great pyramids. Boturini, however, conjectures that as the larger structures were dedicated to the sun and moon, the smaller ones were dedicated to the planets and stars. Near the base of the pyramid of the sun lies a great sculptured stone, 10 ft. 6 in. in length by 5 ft. broad, which it is supposed once crowned the pyramid. Clavigero says that two idols of great bulk, carved of stone, and covered with gold, surmounted both structures; and that the breast of the idol of the sun was hollowed out so as to contain a massive image of the planet in solid gold. He adds that the conquerors immediately possessed themselves of the gold, and that the idol was destroyed by order of the bishop of Mexico.

PYRAMUS AND THISBE, a youth and maiden of Babylon, whose love and fate are celebrated by Ovid in the *Metamorphoses*. Their parents opposed their union, but the lovers, living in adjoining houses, found means to converse with each other through a hole in the wall, and once made an agreement to meet at the tomb of Ninus. There Thisbe arrived first, but, terrified by a lioness which had just torn to pieces an ox, she hid herself in a cave, and in her flight lost her mantle, which was rent by the lioness and soiled with blood. When Pyramus came and found the garment torn and bloody, he imagined that Thisbe had been killed, and thereupon fell upon his sword. When Thisbe returned and found the body of her lover, she slew herself with the same sword. This tragedy was enacted under a mulberry tree, the fruit of which, before white, has ever since been of the color of blood.

PYRÉNÉES, the chain of mountains which separates France from Spain, commencing on the Mediterranean at Cape Creux and running out to the S. E. extremity of the bay of Biscay. Under the name of the Cantabrian mountains, the same chain continues near the N. border of Spain and Portugal to the Atlantic ocean at Cape Finisterre. The distance from the Mediterranean to the bay of Biscay is 270 m. The breadth of the mountain range is from 20 to 60 m., the narrowest portion being near the Mediterranean, and here it is crossed by the carriage road through Figueras. At the W. extremity the pass is through the town of Irun. The mountains consist of a few parallel main ridges, with numerous spurs and transverse elevations, the chain being unbroken throughout its length by the passage of any river across its line. The mountains attain their greatest height and breadth near the central portion of the range. On the S. side the transverse valleys extend down between the tributaries of the Ebro, which stream, rising near the W. extremity of the chain, receives nearly all the waters whose source is on the S. side of the mountains and discharges them into the Mediterranean. These valleys, traced toward their head, sometimes terminate in long depressions reaching far into the axis of the main ridge, the height of which is thus so reduced that the gaps or breaks, called *cols* (necks) and *portes* (gates), serve for passes, rarely however fitted for carriage roads. Sometimes the valleys terminate abruptly in the heart of the mountain, where they are bounded by precipitous walls that rise to great heights. The circular basins thus formed are designated *cirques* or *oules*. The height of the chain is remarkably uniform for long distances. Toward the extremities it falls away, but in the interior much of it exceeds 8,000 or 9,000 feet, within which is the line of perpetual snow. The highest peak is Néthou, 11,068 feet above the sea; after this Mont Perdu, 10,891 feet; Le Cylindre, 10,790; Maladetta, 10,764; Vignemale, 10,716; Montcalm, 10,663; Pic du Midi, 9,350; and many others above 9,000 feet. The mean elevation of the summit line is estimated at 7,990 feet. On the N. side glaciers are occasionally met with upon the highest slopes, but they do not fill up the deep valleys as do those of the Alps. The geological formations are the metamorphic granites and slates, granular limestones, &c. They give a rugged aspect to the higher portions, which, seen from the plains on the French side, appear notched and serrated, whence the term *sierra* applied to such forms. On the Spanish side the same formations are exposed in the deep precipitous cross valleys. Among the mineral products of these rock formations are ores of several of the metals, none of which however have proved of much importance except those of iron. From remote times they have been actively worked, and the most economical method of producing wrought iron direct from the ore was first practised in this region in the furnace still known as the Catalan forge. Beside these products the mountains have afforded large supplies of timber of excellent qualities for ship building. The forests are still extensive, and serve as haunts for bears, wolves, wild boars, foxes, wild goats, and other animals. On the French side are numerous mineral springs, hot and cold, some of which are famous watering places, known as *bagnères*. On this side the pasturage is most excellent and extensive, and on the smoother lands near the base of the mountains are fine orchards and vineyards. On the other side the hardier races are engaged in other occupations, among which smuggling is almost universal. Beside the main passes which connect France with Spain near the Mediterranean and the bay of Biscay, there are several secondary passes not so easily accessible, particularly with carriages. The chief of these are the Puerto de Maya and the Puerto de Roncesvalles in Navarre; those of Canfranc, Panticosa, Gavarnie, Vielsa, Brèche de Roland, and Marcandau in Aragon; and of Plan de Aose, Puigcerda, and Col de Pertus in Catalonia.—The inhabitants of the Pyrénées comprise a variety of people belonging to originally distinct races, several of which yet maintain striking characteristics. On the W. part of the range are the Basques, descendants of the ancient Cantabrians, still retaining the dress and manners of antiquity, and speaking a peculiar language. (See Basques.) The Aragonese are also a peculiar and hardy race, reputed for their obstinacy of character. But on the N. side the French possess the more ardent and volatile disposition belonging to their nation. From early periods of history the Pyrénées have been the scene of interesting military events. Among these are the passage of Hannibal and afterward of Cæsar by the Col de Pertus, and the defeat of Charlemagne in 778 by the Basques near the pass of Roncesvalles, toward the W. extremity of the range. By the same pass the Black Prince invaded Navarre with an English army, and Wellington in 1813 drove the French back into their own country.

PYRÉNÉES, Basses. See Basses-Pyrénées.

PYRÉNÉES, Hautes. See Hautes-Pyrénées.

PYRÉNÉES-ORIENTALES, a S. department of France, comprising the old province of Roussillon, bounded N. by Aude, E. by the Mediterranean sea, S. by Spain, and W. by Ariége; area, 1,571 sq. m.; pop. in 1856, 183,056. Capital, Perpignan. A wide plain stretches along the shore of the Mediterranean, and the Pyrénées, which extend along the S. and W. boundary, have 3 offsets that traverse the department in a general E. and W. direction, forming valleys that are drained by the Agly, the Tet, and the Tech, all of which flow into the Mediterranean, but none of them are navigable. The Aude rises in the E. part of Pyrénées-Orientales and flows N. Mines of coal, sulphur, and alabaster are worked. Iron ore is abundant and is extensively smelted. No part of the soil is very fertile, but the plain bordering the sea is extensively irrigated, and produces luxuriant crops of grass, grain, and vegetables. The vine and olive thrive well in the W. part of the department, and nearly 9,000,000 gallons of wine are annually produced. The principal manufactures are broadcloth, hosiery, moleskins, leather, iron, tin, and pottery.

PYRITES (Gr. πῦρ, fire), an ancient name of certain stones which gave fire when struck by steel; applied by Pliny to millstones, and by others to various minerals, as flint and the bisulphurets of iron and of copper. Dioscorides describes pyrites as a species of stone from which copper is melted. The term is now applied to a variety of native metallic sulphurets, such especially as have a decided metallic lustre; and particularly to the yellow bisulphuret of iron and that of copper. (See Copper, and Iron.) Iron pyrites is a very common mineral, of golden appearance, and is frequently mistaken by those unacquainted with minerals for the precious metal. Its sulphurous character is easily shown by the odor given out when the mineral is crushed and thrown upon a red-hot shovel. Its composition is: sulphur 53.3, iron 46.7. Being often met with in large veins and obtained in abundance in working other ores, of which it serves as a gangue, it is profitably employed for the production of sulphur.

PYROLIGNEOUS ACID (Gr. *πῦρ*, fire, and Lat. *lignum*, wood), also called pyroligneous and wood vinegar, the compound mixture of the volatile products from the destructive distillation of woody matters, and which when purified yield acetic acid, wood naphtha, creosote, tar, &c. The method of producing it is noticed in the article Acetic Acid, vol. i. p. 67, as also its use in the crude state for furnishing compounds useful as mordants in calico print works, as pyrolignate of iron, alumina, &c. It has also been applied to various other uses, as for example, in medicine as an antiseptic and stimulant in a wash for gangrene and ulcers; and its antiseptic qualities have led to its use in preserving articles of food, as herrings and other fish. The process is an auxiliary one to drying in the shade, which precedes the dipping of the articles in the acid. Herrings first cured by a sprinkling of salt left upon them for 6 hours, and then drained, being immersed a few seconds in pyroligneous acid and then dried for two months, are in an excellent condition for preservation and retain a smoky flavor. The addition of a quart of the acid to the common pickle for a barrel of hams will cause the hams to acquire this flavor as if they had been smoked in the ordinary way.

PYROLUSITE. See MANGANESE.

PYROMETER (Gr. πυρ, fire, and μετρον, measure), a thermometer for measuring degrees of temperature above the range of ordinary thermometers, appropriate for indicating the heat of furnaces, the melting point of metals and alloys, &c. The principle upon which most of the various forms of the instrument are based is the expansion of metals by heat, which, for want of any other standard of comparison, is assumed to increase proportionally with the increase of temperature. Musschenbroek, who was the first to construct a pyrometer, and introduced the name about the year 1730, employed a metallic bar fixed at one end, and connected at the other with wheel work which multiplied the movement caused by the expansion of the bar, as this was heated. This was improved by other physicists at subsequent times, their attention being especially directed to the mechanism by which the motion was communicated through wheel work and levers to the index. The principle of this instrument is still retained in the most perfect pyrometer now known, which is that of Professor Daniell, first described in the "Philosophical Transactions" for 1830, and a modification of a similar instrument previously used by Guyton-Morveau. The rod of platinum or of iron is dropped into a longitudinal cavity bored nearly through a bar of thoroughly baked black lead, and rests upon the solid portion at the bottom. A short cylindrical piece of porcelain (called the index) is set on the top of the platinum rod, and projects a little above the top of the black lead bar, to which it is bound by a strap of platinum, the front half of the rod at the top being cut away, so as to leave the porcelain rod partially exposed, and present a shoulder for the adjustment of the scale by which the exact position of the porcelain bar is measured before and after the heating of the apparatus. The index portion of this scale is constructed somewhat like a pair of proportional dividers, and one of the short arms being brought to the same point on the porcelain rods at the two observations, the long arm marks by a vernier upon a graduated arc attached to the extremity of the other long arm 10 times the change in length which the rod has undergone. The degrees on the scale being made with reference to the mercurial scale of the thermometer, the amount of heat to which the rod has been exposed may be immediately expressed in degrees of Fahrenheit. In the construction of the scale, several ingenious contrivances are introduced to increase its delicacy, which cannot be intelligibly explained without drawings. This part of the instrument not being exposed to the fire, its indications must be more accurate than those of other pyrometers, all portions of which are more or less heated in the trials. M. Brongniart employed in 1805 a pyrometer of somewhat similar character to Prof. Daniell's for indicating the comparative heat of the porcelain ovens, and thus the exact time for arresting this in the process of vitrifying the ware in coloring. The heat employed not exceeding the fusing point of silver, this metal was found for several reasons to be the best for the pyrometer. A bar about 8 inches long was inserted in a groove of porcelain, and the free end was made to press against a porcelain rod which moved a needle upon a graduated arc 10 times the distance traversed by the rod. The instrument was not regarded by Brongniart as a correct measurer of degrees of temperature, but only of the difference between the dilatation of a bar of silver and that of a bar of hard porcelain of the same length. The latter element, though small, still amounts to a certain unknown quantity.—A pyrometer was invented by Wedgwood, and described in the "Philosophical Transactions" for 1782, 1784, and 1786, of which much use was made for determining the fusing points of metals; and for a long time these were regarded as established by its very erroneous indications. On this account it is worthy of notice, though it is no longer used. Wedgwood assumed that clay, formed into cylinders, contracted in its dimensions in proportion to the degree of heat to which they were exposed; and his pyrometer consisted of such cylinders with a gauge for measuring their exact length. The principle was proved to be defective, not only from the variable qualities of the clays, and the different methods (as regards pressure especially) of forming the cylinders, but most decisively from the fact that a long continued moderate degree of heat produced as great an amount of shrinkage as a higher degree of shorter continuance.—Owing to the uncertain indications of pyrometers in furnace operations, and the inconveniences attending their use, the condition of furnaces as to the degree of heat is now commonly ascertained by trial pieces of the material operated upon, which pieces are so placed that they may be conveniently taken out for examination. They have a practical value, not attainable by instruments that merely indicate the degree of temperature, in showing the effect already produced upon the articles in the furnace.

PYROPHORUS (Gr. πῦρ, fire, and φέρω, to bear), a substance which takes fire on exposure to the air. This property is possessed by a number of substances and of mixtures specially prepared. Finely divided metals, as iron when reduced from the oxide at the lowest possible temperature by a current of hydrogen, exhibit it in a remarkable degree. The effect appears to be produced in all cases by rapid combination of the oxidizable substance with the oxygen of the air. An excellent pyrophorus is produced by calcining in a close crucible 6 parts of lampblack mixed with 11 of sulphate of potash; the product is a mixture of carbon and sulphuret of potassium. Homberg's pyrophorus is made by stirring a mixture of equal parts of alum and brown sugar in an iron ladle over the fire till it becomes dry; then heating the same in a red-hot vessel nearly closed as long as a flame appears at the aperture. It is then removed from the fire, and carefully stopped until required for the experiment. Tartrate of lead heated to dull redness in a glass tube becomes a brown powder, which when shaken out into the air instantly ignites. It is prepared from the solution of acetate or nitrate of lead by adding to it tartaric acid or a tartrate.

PYROTECHNY (Gr. πῦρ, fire, and τέχνη, art), the art of making fireworks for public exhibitions or for military purposes. Until the invention of gunpowder, and the properties of saltpetre were understood, fireworks may be said to have been unknown in Europe. But the Chinese from an early period were skilful in true pyrotechnic works. Their exhibitions of fireworks have long been of similar character to those now seen among the most advanced nations, and in their variety and the diversity of brilliant colors imparted to the lights they are still unsurpassed. Barrow in his "Travels in China" notices particularly the brilliant pyrotechnic exhibitions, and describes pieces unknown in Europe. One of striking effect was the descent from a box suspended at an elevation of 50 or 60 feet of strings of lanterns, which gradually unfolded themselves to the number of full 500, each one having a light of beautifully colored flame burning within it. From other boxes at the sides descended at the same time an immense network of fire divided into regular figures of the greatest diversity of form and colors, flashing in great splendor and constantly changing. "The whole concluded with a volcano or general explosion and discharge of suns and stars, squibs, crackers, rockets, and granadoes, which involved the gardens for above an hour in a cloud of intolerable smoke." From these exhibitions without doubt useful hints have been afforded for our own fireworks, and some of the materials employed, as the crackers particularly, have been largely exported from China to other countries.—In Europe the pyrotechnic art was first cultivated by the Italians; and it was described by Biringucci Vannoccio in his work, *De la pirotechnia*, published in 1540. In France the subject was treated by J. Hanzelet in his *Traités militaires* (1598). This writer recommended the use of the rocket in war, thus anticipating Congreve. The Chinese, however, had from an unknown period employed the rocket as an offensive weapon, affixing to its front end a pointed barb like that of an arrow. Among the earliest pyrotechnic displays of much note in Europe were the exhibitions at Fontainebleau by Sully in 1606, and by Morel, commissary of artillery, in 1612. The rejoicings at the establishment of peace in 1739 gave occasion for splendid exhibitions at the Hôtel de Ville and the Pont Neuf in Paris, and at Versailles. In the middle of the 18th century the Ruggieris, father and son, acquired great celebrity as artificers of fireworks, and their exhibitions at Rome and at Paris are considered to have been among the most brilliant ever witnessed. At Rome there is at Easter a famous annual exhibition of fireworks on the ramparts of the castle of San Angelo.—The compositions prepared for fireworks are too numerous to be even named in this article, and reference can be made merely to the materials commonly employed, with exemplifications of the manner in which they are compounded in a few of the principal pieces. Gunpowder and its ingredients, nitre, sulphur, and charcoal, are the chief constituents of fireworks. Iron and steel filings and cast iron borings, which must be free from rust, are used to increase the vividness of the combustion, and produce what is known as the Chinese "brilliant fire." It is these which are thrown out by rockets as they explode, and produce the bright sparks as they meet the oxygen of the air. Copper filings and the salts of copper give a greenish tint to the fire; zinc filings, a fine blue; sulphuret of antimony, a light greenish blue with much smoke; amber, rosin, and common salt protected against dampness, are used to give a yellow fire; a red is produced by lampblack, and a pink by nitre in excess; the salts of strontian also give a red color, and those of barytes a green. The fine seeds of *lycopodium clavatum*, one of the club mosses, burn with a vivid flash of a rose color, and are used in theatres to represent lightning, being blown from a tube through the flame of a lamp.—The most useful piece of fireworks is the sky rocket, employed as a signal, and under favorable circumstances visible no less than 30 leagues. (*Bulletin d'encouragement*, Aug. 1821.) As a warlike missile it will be treated under ROCKET. In exhibitions of fireworks the rocket is a luminous projectile, made to dart upward with immense velocity and a loud hissing sound, and explode at the top of its flight. It is sent up singly or in volleys of great numbers together, and as they explode each one commonly discharges colored lights which descend in brilliant showers, or dart forth in every direction with the irregular motions of the so called fusees and serpents. It is made of various compositions, which are packed in tubes formed by rolling paper hard round a cylindrical core and strongly pasting. The following are the compositions recommended for tubes respectively of ½ (A), ¾ to 1 inch (B), and 1½ inches diameter (C):

Ingredients.	Common rocket.			Brilliant fire.			Chinese fire.		
	A	B	C	A	B	C	A	B	C
Nitre	16	16	16	16	16	16	16	16	16
Charcoal	7	8	9	6	7	8	4	5	6
Sulphur	4	4	4	4	4	4	3	3	4
Fine steel filings	..	..	..	3	4	5	..	..	..
Fine borings of cast iron	..	..	..	.	..	..	3	4	5

At what is to be the lower end the tube is pinched in or "choked" to one third its diameter, and in this end is inserted a long, slightly conical iron spike, its upper pointed end reaching very near the top of the case. The spike is merely a temporary core, around which the composition is packed, and which being finally removed leaves a cavity of its own dimensions in the axis of the rocket. Sometimes the case is filled up solid and the cavity is bored out in the composition. As the composition must be powerfully rammed, the case is supported in a cylindrical mould of wood or copper, which it exactly fits. The rammer is of gun metal or of some material which will not strike fire, and is made hollow to admit the spike. It is driven with well regulated blows upon the composition, which is introduced a little at a time. The regularity of movement of the rocket depends on the charge being uniformly compact throughout. When the point of the spike has been entirely covered, a disk of doubled paper is laid over the charge, and the inner part of the case projecting above is turned down and rammed, thus making a close cover. This is, however, pierced with a few holes, and in the remaining receptacle are placed, together with some gunpowder, or with the same composition already employed, ornamental objects, as stars, sparks, &c., or for signal rockets merely gunpowder slightly rammed and connected by a single hole with the charge below. The top of the case is then turned in and securely pasted down. As this end is to go foremost, a cone of paper is attached to it to lessen the resistance of the air. For rockets carrying more of the "decorations," as serpents, crackers, &c., a cylindrical case of greater diameter than that of the rocket itself is fitted upon the upper end, which it encloses, and to which it is tightly secured by twine and paste. The match by which the rocket is to be fired is introduced into the cavity at the bottom, and the whole exposed surface of the composition forming the walls of the cavity is instantly ignited. The gaseous products, being violently ejected from the open end, react with equal force, carrying the rocket forward in the other direction. The movement however would be extremly wild if not controlled by some regulator. This is furnished in a long balance stick firmly tied to the rocket and projecting several feet behind. It is made of light wood, and when it is set free after the explosion it rarely falls with sufficient velocity to do any harm. Long triangular pieces of pasteboard have been secured by the edge to the sides of the rocket as a substitute for the stick, and have also served to steady its movement. Among the decorations or garnitures for the rockets are stars, small cylindrical or cubical bodies variously compounded, as of 1 part of sulphuret of antimony, 2 of quartz, 2 of gunpowder, 15 of nitre, 6 of sulphur, and 3 of zinc filings. The materials, being separately pulverized, are mixed into a stiff paste with gum water or glue, made into the desired shapes, rolled in gunpowder, and dried. Other compositions, which before using should be soaked in alcohol, are nitre 16, to 8 or 7 of sulphur, and 3 or 4 of gunpowder; or for golden showers, to the same proportion of nitre may be added sulphur 10 or 8, charcoal 4 or 2, gunpowder 16 or 8, lampblack 2. The selection of the latter figures, where there is a choice, will give showers more yellow.—Roman candles are cylindrical cases charged with stars alternating with a composition like that of the rockets, and with gunpowder. A small quantity of the composition is rammed into the bottom of the case, upon this a little gunpowder, and a star is then pushed down upon the powder. These charges are repeated in the same order until the case is filled. The end is then closed with a piece of match paper pasted round the outside and drawn to a point at the top. When this is fired the charges are shot at short intervals successively from the tube into the air. The effect is heightened by varying the compositions and colors of the stars. A red fire adapted for this or other pieces may be made by mixing 4 parts of dry nitrate of strontia with 15 of pulverized gunpowder; or this may be varied with 40 parts of the strontia, 13 of sulphur, 5 of chlorate of potash, and 4 of sulphuret of antimony. The usual precautions should be observed in pulverizing and mixing the chlorate of potash. A green fire like that burned in theatres, and which gives to every thing upon the stage a death-like aspect, is produced by 77 parts of nitrate of barytes, 13 of sulphur, 5 of chlorate of potash, 3 of pulverized charcoal, and 2 of arsenic.—Bengal lights, also called blue lights, and used by ships as night signals, are compounded of nitre 7 or 5, sulphur 2, antimony 1; or for the sparkling ones, 4 each of sulphur and nitre, 1 of antimony, and 2 of fulminating composition (of fulminating mercury and gunpowder). The proportions of these ingredients may be variously modified from those given.—Some of the most brilliant pyrotechnic displays are of wheels affixed to frames by a pin upon which they turn freely, the motion being caused by the reaction of discharges from tubes secured to the periphery or spokes. By varying the charges and introducing different colors, and by combinations of wheels, the most diversified and curious displays are produced. The Ruggieris were exceedingly ingenious in their devices of this character, and among other improvements they invented the method of causing one piece to ignite another and thus keep up a succession of exhibitions.—The published works on pyrotechny are mostly of the 17th and 18th centuries. Those of more recent date are: *L'art de faire à peu de frais les feux d'artifice* (Paris, 1825); *Manuel de l'artificier*, by A. D. Vergnaud (Paris, 1829); and "Pyrotechny," by G. W. Mortimer (London, 1852). The fullest work in English is an American book, "System of Pyrotechny, comprehending the Theory and Practice, with the Application of Chemistry," by James Cutbush (large 8vo., Philadelphia, 1825).

PYROXENE (Gr. πῦρ, fire, and ξένος, a stranger), a mineral species of Dana's augite section of the silicates, comprising numerous varieties. That to which the name was first applied, though found in the so called igneous rocks, did not occur, it was supposed, in modern lavas; whence the name. The species is an interesting one for its many varieties, which differ from each other in physical characters and chemical constituents, and consequently have been separated by different mineralogists among several species. They were first brought together under the head of pyroxene by Haüy, who recognized the identity of the crystalline form common to them all; and though for a time the relationship among them was not admitted by chemists, it was at last found that the differences in their composition resulted from the substitution of one isomorphous element for another, and that one general formula might be used to express the combination of silicic acid with one or more of the following bases (one replaced for another in any proportions), viz.: lime, magnesia, protoxide of iron, or manganese, and sometimes soda. Alumina may also enter into the composition, replacing it may be a portion of silicic acid, without essentially changing the crystallization. Among the varieties comprised in this species are the augites, coccolite, diopside, sahlite, Jeffersonite, and many others.

PYROXYLIC SPIRIT (also known as pyroligneous spirit or ether, wood spirit or naphtha, methylic alcohol, hydrate of methyle, &c.), a spirituous liquid, not a product of fermentation, but forming one of the most volatile constituents of pyroligneous acid, from which it is obtained in the process of purifying this acid by distillation. (See Acetic Acid, and Naphtha.) When purified, wood spirit is a colorless liquid of a penetrating empyreumatic odor, and a disagreeable burning taste. It is very inflammable, burning like alcohol with a blue flame. It mixes with water, alcohol, and ether in all proportions. It boils at 150°, and at 68° its specific gravity is 0.798; at 32°, 0.8179. The substance was first recognized by P. Taylor in 1812; but its properties were first explained by Dumas and Peligot in 1835. In Great Britain wood naphtha, not being subject to the excise duty, has been a valuable substitute for alcohol in various manufactures. By repeated rectifications over lime or chalk, and rejecting the latter portions in the distillations, it was obtained of strength varying from 60 to 90 per cent. of pure spirit, and of specific gravity from 0.87 to 0.82. From its property of dissolving the resins it was much used in the production of varnishes, lacquers, &c., and by the hatters for their solutions of shellac. The government now permitting the mixture of 90 parts of alcohol with 10 of purified wood naphtha to be employed free of duty under the name of "methylated spirit," the demand for the naphtha has greatly fallen off. The medical properties of wood naphtha are narcotic, sedative, and anti-emetic; and it has proved efficient in arresting or greatly mitigating chronic vomiting; also as a remedy in diarrhœa and dysentery, in doses of 10 to 40 drops in water 3 times daily. Though formerly recommended in pulmonary consumption, it is found to have no further effect than to palliate the cough and lessen the febrile excitement.

PYRRHA. See Deucalion.

PYRRHO, a Greek sceptical philosopher, a native of Elis, born probably in 375 B. C., died in 285. He was successively a poor painter, a poet, a disciple of the Megaric school, a student of the writings of Democritus, and a companion of the Democritean philosopher Anaxarchus, under whose patronage he joined the eastern expedition of Alexander the Great. He addressed a poem to that monarch, which was munificently rewarded with 10,000 pieces of gold. He accompanied the Indian campaign, and thus became acquainted with the doctrines and practices of the Indian gymnosophists, as well as those of the Persian magi. In the most active and important period of Greek philosophy he surveyed the results alike of Greek and oriental speculation only as a preparation for the establishment of a complete system of scepticism. He returned to Greece weary of the falsehood and vanity of the camp and court, and cherishing as the highest good the utmost repose and peace of mind. He lived in retirement, probably in his native city, and apparently in indolence, yet was honored by his countrymen with the office of high priest. For his sake, also, a law was passed exempting philosophers from the payment of taxes. His disciple Timon, who reported many conversations with him, extols with admiration his divine repose of soul, his independence of every thing external, and his lofty indifference to sophistry, and compares him to the imperturbable sun god dwelling above the earth. The only condition which he deemed worthy of a philosopher was that of suspended judgment. He would neither assert nor assent to any proposition. He and his followers were called inquirers, who sought the truth; sceptics or examiners, who always considered and never discovered; ephectics, from the state of suspense which they cherished; and doubters, from the logical dilemmas out of which they could not extricate themselves. Suspense was rather a practical than a speculative principle with him, and he refused to undertake any philosophical justification of it. His merit as a sceptical philosopher consists only in his rigorous adherence to the sceptical idea, which he developed into no system. No writings are attributed to him, except his poem addressed to Alexander. His doctrines were expounded by Timon, called by Sextus Empiricus his prophet.

PYRRHUS, son of Achilles. See NEOPTOLEMUS.

PYRRHUS, king of Epirus, born about 318 B. C., killed at Argos in 272. He was the son of Æacides and Phthia, and traced his descent from Pyrrhus, the son of Achilles, and was also connected with the royal family of Macedon. His father having been dethroned by the Epirotes, Pyrrhus was rescued and brought to Glaucias, king of the Taulantians, who educated him with his own children. When Cassander's power in Greece was weakened, his protector was enabled to restore Pyrrhus to his throne; but he did not long enjoy his sovereignty, as he was again expelled by the Epirotes, and fled to his brother-in-law Demetrius Poliorcetes, who was then in Asia. He distinguished himself at the battle of Ipsus in 301, and subsequently went into Egypt as a hostage for Demetrius. There he gained the good will of Ptolemy's wife, Berenice, married her daughter Antigone, and was furnished by the king with a fleet and troops to recover Epirus. He found Neoptolemus in possession of the throne, and the two consented to hold it in common; but presently, to prevent his own destruction, Pyrrhus put Neoptolemus to death (295). He now interfered in the quarrels of Antipater and Alexander, the two sons of Cassander, and took the part of the latter on condition that Acarnania, Amphilochia, and Ambracia should be ceded to himself, with the Macedonian districts of Tymphæa and Parauæa. He then placed Alexander on the throne of Macedon, but the latter was soon after dethroned and put to death by Demetrius, to whom he had also applied for aid, and who made himself king in his place. Hostilities soon arose between these two powerful neighbors, who had formerly been close friends. War broke out in 291, in which year Thebes revolted from Demetrius; and while the Macedonian king was engaged in the siege of that place Pyrrhus marched into Thessaly, but was forced to retire. Thebes having fallen in 290, Demetrius invaded Epirus in 289, leaving Pantauchus in Ætolia with a large force to keep the Ætolians in subjection. Pyrrhus, advancing to meet Demetrius, but taking a different route, entered Ætolia, encountered Pantauchus, and defeated his army, vanquishing him in single combat. The next year he invaded Macedonia, and marched as far as Edessa, but was driven back, and soon after concluded a peace with Demetrius, who was now anxious to regain his father's dominions in Asia. Hereupon Seleucus, Ptolemy, and Lysimachus entered into an alliance which they persuaded Pyrrhus to join, to attack the Macedonian king in his European dominions. Demetrius was forced to flee, and his kingdom was divided, a large share of Macedonia falling into the hands of Pyrrhus. Soon, however, the Macedonians drove him out again, and put themselves under Lysimachus. In 281 an embassy from the Tarentines implored Pyrrhus to come over to Italy and assist the Greek inhabitants against the Romans. He set out in 280 with an army of 20,000 foot, 3,000 horse, 2,000 archers, 500 slingers, and a number of elephants. But a great storm arose and scattered the fleet, and Pyrrhus arrived at Tarentum after nearly losing his own life. There, while waiting for the dispersed ships to come in, finding the inhabitants indisposed to take their proper share in the war, he compelled them to enter the army, closed their theatres, and soon showed himself their master as well as ally. Failing to negotiate with M. Valerius Lævinus, the Roman general, Pyrrhus met him on the river Siris and won a victory with the loss of a large number of his best troops. "Another such victory," he is reported to have said, "and I must return to Epirus alone." He now sent Cineas to Rome offering peace on condition that the independence of the Italian Greeks should be recognized, and that the Samnites, Lucanians, Apulians, and Bruttians should regain the possessions they had lost in war. Although many of their allies had deserted them at this time, and their condition seemed critical, the Roman senate rejected the terms. Hereupon Pyrrhus marched to within 24 miles of Rome, plundering the country as he went; but the arrival of the Roman army from Etruria placed him under the necessity of retiring. Taking up his winter quarters in Tarentum, he took the field in the spring of 279, and gained a hardly won victory at Asculum. Few of his Grecian troops were now left; and, unable to obtain reënforcements from home, he was willing to conclude a truce in order to drive the Carthaginians from Sicily. Previously the Roman consuls Fabricius and Æmilius had sent back to Pyrrhus a servant who had deserted and promised to poison his master, and in return for this Pyrrhus released all the Roman prisoners. He now passed over into Sicily, and at first was so successful that the Carthaginians agreed to assist him with ships and money against the Romans on condition of peace. But rejecting this offer, and shortly after failing in an attack upon Lilybæum, his credit so much declined, and with it his fortune, that he was glad to return to Italy in 276. His fleet was attacked by the Carthaginians, and 70 of his ships destroyed. He remained in Italy, carrying on an indecisive war, until 275, when he was routed near Beneventum by Curius Dentatus, and obliged to return to Epirus, having become poor both in troops and resources. In 273 he invaded Macedonia, and for the second time gained possession of that country. At the instance of Cleonymus, who had been excluded from the Spartan throne, he marched into Laconia in 272 with 25,000 foot, 2,000 horse, and 24 elephants. Against such a force resistance seemed useless. He arrived before Sparta at the close of day, but deferred the attack until the following morning. During the night the Spartans succeeded in fortifying themselves so strongly as to be able to hold the city until relieved by the arrival of reinforcements. Taking up his winter quarters in Laconia, Pyrrhus was induced to interfere in the affairs of Argos, and in a conflict in the streets of that city he received a slight wound from a javelin. He was about to cut down the Argive who had attacked him, when the mother of the man, seeing the danger of her son, hurled down from the roof of a house a large tile which struck Pyrrhus on the back of the neck. Stunned by the blow, he fell from his horse and was killed by some of the soldiers of the enemy, by whom he had been recognized. Pyrrhus wrote commentaries, which were used by Dionysius and Plutarch, and also composed a treatise on the art of war, which was extant in the time of Cicero.

PYTHAGORAS, a Greek philosopher, founder of a philosophical, religious, and political association in southern Italy, born in Samos about 580 B. C., died probably in Metapontum about 504. The absence of any writings proceeding from himself, the few contemporary memorials of him, the mystery which veiled the constitution and conduct of his brotherhood, the extravagant legends which prevailed concerning him and were adopted by his Neo-Platonic biographers, and the consequent confusion of different ages of Pythagoreanism, make him one of the most obscure personages in Greek history. A uniformity, however, prevails throughout his philosophy, by whomsoever developed, the germs of which, at least, must have been derived from himself, while his personal authority appears also in the sway which his societies long exercised over the Italian cities. He was the son of Mnesarchus, an opulent merchant, was a disciple of Pherecydes of Syros, and perhaps also of Thales and Anaximander, and is said to have spent 30 years in wide-reaching travels for the purpose of collecting all attainable knowledge, especially the esoteric doctrines of priests concerning the worship of the gods. Egypt, Arabia, Phœnicia, Judæa, Babylon, and even Gaul and India, are mentioned among the countries in which he travelled. Grote decides that he probably visited Egypt, and that he may there have derived from conversation with the priests, and from initiation into the various mysteries, his turn for symbolical ceremonials and ascetic practices. It is asserted by a few scholars that nothing either in his doctrine or institutions implies an oriental origin or any foreign influence. His contemporary Heraclitus said of him: "He has made more inquiries than any other man; he has acquired wisdom, knowledge, and mischievous refinement." Xenophanes, also his contemporary, related that he believed in the metempsychosis, or transmigration of souls, and that seeing a dog beaten, and hearing him howl, he begged the striker to desist, adding: "It is the soul of a friend of mine, whom I recognized by his voice." Later authorities ascribe to him the discoveries that the triangle in a semicircle is right-angled, and that the square on the hypothenuse of a right-angled triangle is equal to the sum of the squares on the other two sides, and also discoveries in the theory of music and in medicine. Apart from authentic testimony, it is probable from the character of his followers that he was especially skilled in geometry and arithmetic, and that the Pythagoreans were taught by him to regard numbers as in some mysterious manner the basis and essence of all things. It was however rather as a religious teacher than a philosopher that he made his profound impression upon his contemporaries; and while the druids of Gaul, the gymnosophists of India, or the priests of Egypt and Phrygia have been regarded as the source of his religious doctrines, it is supposed by Ritter that he derived by tradition a secret mystical cultus which he rather developed than modified. He is said to have returned to Samos when about 40 years of age, with religious zeal the predominant element in his character. His native island, under the despotism of Polycrates, was unfavorable to the dissemination of his doctrines, and he emigrated to Crotona in Italy, then distinguished for the superiority of its physicians and the excellent *physique* of its citizens. There is no evidence to confirm the statements of Porphyry and Iamblichus that he withdrew because the public honors conferred on him by the Samites interfered with his schemes in behalf of religion and philosophy. He immediately acquired personal ascendency on reaching Crotona. At his first eloquent discourse no fewer than 2,000 persons are said to have been converted, and the aristocratic council of 1,000 persons, in which the supreme authority was vested, offered to him its presidency. From the marvellous stories of his biographers there is reason to believe that he was received as a person favored by the gods and as a revealer of divine secrets; that he was at once revered by the multitude and honored and obeyed by numerous adherents of the powerful and wealthy classes; that he formed a brotherhood of 300 bound by a vow to a peculiar diet and by common religious observances and hopes; and that this club of influential men gradually and successfully mingled political with religious and scientific motives. That he required a long novitiate of silence, possessed a remarkable skill in reading character, instituted a peculiar diet and discipline, rigidly cared for sobriety as conducive to physical vigor, and employed music to soothe the passions, are mentioned among the sources of his power. The whole discipline was designed to produce a lofty serenity and self-possession, and to raise its votaries above the level of mankind. It does not appear, however, that all were subjected to the same training or studies, since Milo, the most famous wrestler of his age, was among them, and could not have dispensed with animal food. The Pythagoreans soon became ascendant in the government of Crotona, and exerted their power in favor of the aristocratic party. Proud of the religious ideas and ethical tone of their master, they were haughtily exclusive, physically and intellectually efficient, and politically domineering. Kindred clubs were established at Sybaris, Metapontum, Tarentum, and other cities, and the doctrines and influence of Pythagoras spread rapidly over Magna Græcia. Concerning the internal administration of the brotherhood little is certainly known, since every thing that was done and taught was kept a profound secret. The members are usually divided into the esoteric and the exoteric, the former being, according to Ritter, specially instructed in the religious rites and doctrines, in the more recondite Pythagorean speculations. The daily routine, as given by Iamblichus, resembles the discipline of Spartan citizens. Müller calls the Pythagorean discipline the expression of Grecian Dorism as opposed to Ionic tendencies. Lobeck maintains the identity of the Pythagorean and the Orphic life, regarding the latter as only the modification of the former after it was transplanted to Greece. The political prominence of the Pythagoreans, and the democratic jealousy caused by their aristocratic exclusiveness, led to their overthrow. The war which resulted in the conquest of Sybaris (510 B. C.) was undertaken by their advice, and the Crotonian forces were commanded by their athlete Milo. The victory encouraged them to resist more actively than before the attempt of the popular party to obtain a share in the government of Crotona, and they gave signal offence by refusing to divide among the people the territory of the recently conquered city. Their enemies ventured upon determined opposition to them, and the result was a revolution by which a new senate was constituted, taken by lot from all the people. The popular party was now unrestrained, and the Pythagoreans were attacked in their assembly house, the building set on fire, and all but the younger and more vigorous members perished. The order was in like manner violently suppressed in the other cities of Magna Græcia, having endured about 20 years. Yet it continued to exist as a philosophical sect, devoted to religious and scientific interests. Pythagoras himself is variously stated to have been burned in the temple with his disciples, to have died a short time previously, and to have perished long afterward in exile at Metapontum after 40 days of voluntary abstinence from food. According to Müller, "the influence of the Pythagorean league upon the administration of the Italian states was of the most beneficial kind, which continued for many generations after the dissolution of the league itself."—The first publication of the Pythagorean philosophy was made by Philolaus and Archytas, contemporaries of Plato, and among the last members of the expiring sect, from whom nearly every thing trustworthy on the subject seems to have been derived. It was exaggerated and distorted by Apollonius of Tyana and the Neo-Pythagoreans from the age of Cicero, who were rather thaumaturgists than philosophers, and who were gradually confounded with the Neo-Platonists. The fundamental doctrines are, that the essences of all things rest upon numerical relations; that numbers are the principle of all that exists; and that the world subsists by the rhythmical order of its different elements. Everywhere in nature appear the two elements of the finite and the infinite, which give rise to the elementary opposites of the universe, the odd and even, one and many, right and left, male and female, fixed and moved, straight and curved, light and darkness, square and oblong, good and bad. The essence of number is unity, which is at once odd and even, and contains in itself in germ all the universe. It is at once the form and the substance of all things, and identical with the Deity. Proceeding from itself it begets duality, and returning upon itself it begets trinity. Added to itself it produces the line; a third point placed on the other two gives the surface; and a fourth point placed on the other three gives the pyramid or solid. The quadrate or tetractys and the decade are, like unity, sacred numbers and first principles. The universe was produced by the breathing of the first principle into the infinite void of the world, which thus became both finite and infinite, and therefore capable of development into a multiplicity of numbers or things. In the actual world every single whole is a unit, capable of further development by the vital process of breathing. Every abstract idea is a number, and material objects are symbols of numbers. There are 5 elements, the earth, fire, air, water, and ether, represented respectively by the cube, pyramid, octahedron, icosahedron, and dodecahedron. The universe is a harmonious whole, consisting of 10 great bodies revolving in a choral dance around a common centre, and producing by their harmonious movements the music of the spheres. The centre is the sun, the seat of Jupiter, the principle of life, and the most perfect object in nature. The stars also are divinities, and men and even inferior animals are akin to the Supreme Being. The souls of men are moving numbers, light particles from the universal soul, capable of combining with any body, and destined to pass successively through several. With the theory of metempsychosis he combined the doctrine of moral retribution. The reason and understanding have their seats in the brain; the passions are placed in the heart. Moral good was identified with unity, evil with multiplicity; virtue was the harmony of the soul and its similitude to God. The aim of life was to make it represent the beautiful order of the universe. The whole practical tendency of Pythagoreanism was ascetic, and inculcated a strict self-control and an earnest culture. Though it seems to have been founded on the mysticism of numbers, yet it was regarded as a scientific doctrine by Aristotle, who called the Pythagoreans a school of mathematicians.—Pythagoreanism was of little account in the scholastic philosophy, but its doctrines of numbers were recognized in the mysteries of alchemy, and in the symbols of mystical architecture. To Albert of Strasbourg was attributed a complete scientific, moral, and architectural system founded on numerical relations. At the revival of learning Pythagorean tenets lay at the basis of the speculations of Nicholas of Ousa, and mingled with those of Giordano Bruno. In the present century Joseph de Maistre has developed anew the mysterious qualities of numbers, and Leroux's doctrines of the triad and of the metempsychosis recall the speculations of Pythagoras.

PYTHEAS, a Greek navigator of Marseilles, who flourished about the age of Alexander the Great. He is said to have made two voyages, in one of which he visited Britain and Thule (perhaps Iceland), and in the second passed along the western and northern coast of Europe. He also wrote two books, one of which, describing the ocean, was probably an account of his first voyage, and the other, entitled *Periplus*, of his second. In these works he stated that he had visited Britain, and that it was 40,000 stadia in circumference. Moreover, he said that in Thule the days and nights were 6 months long, and that in the summer solstice the sun never disappeared from the horizon. The Tanaïs to which Pytheas refers is probably the Elbe. By many ancient writers, especially Polybius and Strabo, the statements of Pytheas are treated with contempt, the latter in several places calling him a great liar; but in modern times it has become evident that he was a bold navigator and sagacious observer. He was the first who determined the latitude of a place from the shadow cast by the sun, obtaining the position of Massilia by means of a gnomon. He was also aware of the influence of the moon upon the tides. The few fragments of Pytheas now extant were collected by Arvedson (Upsal, 1824).

PYTHIA. See DELPHI.

PYTHIAN GAMES, one of the 4 great national festivals of Greece, held at Delphi, which was originally called Pytho from the serpent Python killed by Apollo near there. The legendary account attributed the origin of these games to Apollo, although there were traditions also referring them to Amphictyon, Diomedes, and other heroes. At first the Delphians themselves decided the disputes and adjudged the prizes, but after the Crissæan war the management came into the hands of the Amphictyons. Once, in Ol. 122, the games were held in Athens by the advice of Demetrius Poliorcetes. They appear to have lasted as long as the Olympic games, or till about A. D. 394. They were held in the Crissæan plain, which had a theatre for the musical contests, a race course, a stadium 1,000 feet long, and probably a gymnasium, prytaneum, and similar buildings. Some ancient writers tell us that they were first called Pythian games in Ol. 48, when the Amphictyons assumed their management. Previously they had been held at the end of every 8 years, but afterward at the end of every 4. They were probably solemnized in the spring, and lasted several days. There were other Pythian games of less importance held in various places in Greece, in Asia Minor, and Italy, where the worship of Apollo was established.

PYTHIAS, See DAMON.

PYTHON (Daudin), a genus of large tropical, non-venomous serpents, replacing in the old world the boas of the new. (See BOA.) The pythons differ from the boas in having 4 teeth in the intermaxillary bone, and in most of the subcaudal scales being in pairs. Most of the species of these large serpents have been exhibited alive in European and American zoological gardens and menageries, though in this country they are far less commonly seen than the South American boas. The python of Java (*P. reticulatus*, Gray) is one of the handsomest of the genus, being laced with brilliant golden and black; it attains a length of 30 feet, and possesses sufficient strength, it is said, to overcome the buffalo. The Indian rock snake (*P. molurus*, Gray) attains a similar size; it is marked above with yellow, black, and brown, and is white beneath spotted with black; it is the *oular sawa* of the Malays; it frequents rice fields and marshy places, and feeds principally on hogs and muntjacs. In Africa belongs the Natal python or rock snake (*P. Natalis*, Smith), from the vicinity of Port Natal; it attains a length of more than 25 feet and the thickness of a man's body; the South Africans have such a superstitious dread of it that they will seldom attack it even when powerless from being gorged with food. Seba's or the two-banded python (*P. bivittatus*, Kuhl) has 2 brownish black bands along the sides of the back; it attains a length of more than 20 feet, and is especially abundant in the Senegal region. The royal python (*P. Bellii*, Gray), from the same localities, is a brightly marked species, of a shorter and thicker form.

Q

Q, the 17th letter and 18th consonant of the English alphabet. It corresponds with the Hebrew and Phœnician *koph*, and as it is seldom used except in conjunction with *u*, most grammarians are disposed to regard it as a superfluous letter whose place could be supplied by *k*. It does not occur in the Greek, old Latin, Slavic, Irish, or Saxon alphabet, though it was introduced into the Latin at a pretty early period. The words which are now written with a *q* were spelt by the ancient Romans with *c*, as *anticus* for *antiquus*, *cotidie* for *quotidie;* and some words are still spelt indiscriminately with either, as *locutus* or *loquutus*. Varro and some other grammarians never consented to admit this letter into the Roman alphabet. Others regarded it not as a simple letter, but as a contraction of *cv* or *cu;* thus *quis*, according to them, was originally *cvis* or *qis*. The Anglo-Saxons for *qu* wrote *cw*. Q never ends a word in English, but it does in French, as *cinq*, and in other modern European languages. The letters with which it interchanges are *c* and *k*. As a numeral it stands for 500, or with a dash over it ($\bar{Q}$) for 500,000. Used as an abbreviation, it signifies *quantum*, *quod*, *quæ*, *que* (and), Quintus, &c.

QUA BIRD. See Night Heron.

QUACKENBOS, George Payn, an American educator, born in New York in 1826. He was graduated at Columbia college in 1843, and soon after commenced teaching in North Carolina. He has continued in this profession with a brief interval ever since, having in 1847 opened a private school in New York city, and has beside been connected with various journals as contributor, correspondent, and editor. In 1848 he established the "Literary American," which he conducted for two years. He has published a number of popular school books, including an "Advanced Course of Composition and Rhetoric" (1854); "Illustrated School History of the United States" (1857); "A Natural Philosophy for Schools and Academies" (1859); and "Primary History of the United States" (1860); and has prepared an American edition of Spiers and Surenne's French and English dictionary (1852).

QUADI, an ancient powerful people of S. E. Germany, of the Suevic race. They inhabited the country between Mount Gabreta, the Hercynian forest, the Sarmatian mountains, and the Danube, their neighbors being the Gothini and Osi on the N., the Jazyges Metanastæ on the E., the Pannonians on the S., and the Marcomanni on the W. With the last named people they were on terms of alliance. In the reign of Tiberius the Romans erected a kingdom of the Quadi between the rivers Marus (March?) and Cusus (Waag?), gave the
to Vannius, who belonged to that tribe
kept it for a long time under their prote
but in the reign of Marcus Aurelius the Q
joined the great German confederacy a
the empire, and in 174 were on the poi
destroying the imperial legions in a great b
when a sudden storm, attributed to the pr
of the Christian soldiers in the emperor's a
enabled the Romans to recover from their
fusion and achieve a complete victory. I
independence of the Quadi was recogniz
Commodus in 180. They disappear from
tory about the close of the 4th century.

QUADRANT, the fourth part; com
applied to the fourth part of the circle
arc of 90°, and also to instruments em
for measuring angles in any plane. The u
quadrants has been for surveying and for
ing astronomical observations, and espec
navigation for determining the meridian
tude of the sun and through this the lati
of the observer. They have been constr
of a great variety of forms and dimen
adapted for their several uses; but at pre
the interest attached to them is historical
as they have been entirely superseded either
sextants or the full circle. The former
more portable form than the quadrant, by
use of two reflecting mirrors double the
included between the direct and reflected
of light, and thus with an arc of 60° or
the circle include a range of 120°; while
circle, on account of the symmetry of its
and the completeness of its graduated ar
around, secures greater exactness in its rea
ings, and is less liable to the introductio
any unsuspected source of error. Quadr
were employed as far back as the time
Ptolemy, who made use of one for determi
the obliquity of the ecliptic. Tycho Br
had a large mural quadrant (so called from
being suspended upon an axis secured in a
wall of masonry) with which he observed a
tudes, and also another on a vertical axis
measuring horizontal angles. The mural quad-
rants of that period were large instruments
6 or 8 feet radius, and for some time continu
to be employed in the principal observatories.
Sir Isaac Newton is said to have constructed a
reflecting quadrant as early as the year 16
but the first instrument of this character brou
before the public was that afterward known
Hadley's, the invention of which was claimed
by Godfrey, a mechanician of Philadelphia.
(See Godfrey, Thomas, and Hadley, John.)
This instrument, which has been in general
use in navigation, is a graduated octant of
half degrees, reading as 90° With the radi

bars at each extremity of the arc it forms a triangular frame, which is made of convenient dimensions for holding in the hands. A movable radial bar or index revolves in the plane of the sector upon a pin passing through the centre. At the centre it carries a mirror, the face of which is perpendicular to this plane, and which in making an observation is turned toward the object, as the sun or a star, and at the other end it carries a vernier for subdividing the angles on the graduated limb. Upon the outer edge of the radial bar, back of the movable mirror, is set the sight vane, which is directed across to a second mirror fixed upon the opposite bar, its plane perpendicular to that of the bar, and its face so adjusted that a ray reflected from the first mirror to the second is transmitted from this to the eye at the sight vane. Only half of the glass of the second mirror, called the fore horizon glass, is silvered, and consequently rays passing through it from any object, as the horizon at sea, meet the eye in a direct line; and if at the same instant, while the instrument is held in this position, the index is moved so as to bring the reflected image of the sun upon the silvered part of the glass and from this to the eye, the reading of the vernier is the elevation of the sun above the horizon. Various other appendages are introduced in the quadrant, as a telescope for the sight vane, colored glasses for diminishing the intensity of the light, and a third mirror called the back horizon glass, with its sight vane, for taking a back observation. (For Gunter's quadrant, see GUNTER.)—In gunnery, the quadrant or gunner's square is a rectangular frame with a graduated arc between the two limbs. One of the limbs is extended beyond the arc, so as to be set into the mouth of the piece, the elevation of which it is to measure. A plummet suspended from the point of meeting of the two arms marks by the intersection of its line on the graduated arc the degree of elevation.

QUADRATURE, the finding of a square equal in area to that of any given figure. No mathematical problem has excited so great interest as the quadrature of the circle, or the determination of a square of the same area. As it is proved that the area of a circle is equal to that of a right angled triangle, the altitude of which is the radius of the circle and the base its circumference, and as the side of the square of equal surface with the triangle is a mean proportional between the height and half the base of the triangle, the problem would be solved if the circumference could be immediately calculated from the radius which is known. Thus the question of the quadrature of the circle is reduced to finding the proportion between the diameter and circumference. Archimedes undertook the solution of the problem on the principle of calculating the peripheries of two polygons of many sides (as 96), one circumscribed about the circle and the other inscribed, between which must lie the circumference of the circle. He thus found that the ratio of the diameter of the circumference lay between $1 : 3\frac{10}{71}$ and $1 : 3\frac{1}{7}$, and he adopted the former, which is also expressed 7 : 22. The Hindoos at some early period—certainly before any improvement was made upon this result in Europe—obtained the proportion 1,250 : 3,927, or 3.1416, which is much more exact than that of Archimedes. Ptolemy gives 3.141552, which is not quite so correct. In modern times the first great step in extending this calculation was made by Peter Metius, a Hollander, and was published by his son Adrian Metius. By calculating from polygons of about 1,536 sides he found that the proportion was less than $3\frac{17}{120}$ and greater than $3\frac{15}{106}$; and presuming that the mean of these was nearer the truth than either limit, he happily hit thus by chance on a near approximation, and determined a ratio convenient for practical purposes, and easy to recollect from its terms being made up of successive pairs of the first 3 odd numbers, viz.: 113 : 355. The error involved in this expression in a circle of 1,900 miles circumference is less than one foot. Ludolph van Ceulen, another Hollander, in 1590, about the same time that Metius made his calculations, extended the calculation to 36 figures, which are engraved upon his tombstone in Leyden. These are 3.14159265358979323846264338327950289. The last figure is too large, and 8 would be too small. This was obtained by calculating the chords of successive arcs, each one being half of the preceding; for the above result this was carried out so far, that the last arc was one side of a polygon of 36,893,488,147,419,103,232 sides. The method of calculation was greatly simplified by Snell, who carried the computation to 55 decimal places by means of a polygon of only 5,242,880 sides. By other mathematicians the computation was carried on, reaching successively during the last century 75, 100, 128, and 140 places of decimals; and Montucla received from Baron Zach 154 figures, said to have been obtained from a manuscript in the Radcliffe library at Oxford, of the existence of which there is no other evidence. The figures, however, except the last two, have since been proved correct. (See Montucla, *Histoire des recherches sur la quadrature du cercle*, 1754.) Notwithstanding that Lambert in 1761, and still later Legendre in his *Éléments de géométrie*, proved that the ratio of the diameter to the circumference cannot be expressed by any numbers, the wish to satisfy those who still sought the exact expression of this ratio led other mathematicians to continue to add to these figures; and some must have derived a singular gratification in the computation itself and its never terminating result. In May, 1841, a paper was communicated to the royal society by Dr. Rutherford of Woolwich, presenting 208 figures of decimals, of which however 56 were afterward proved to be wrong, so that the series was not really carried beyond the result obtained from the Oxford MS. In 1846 200 decimals were correctly made out by Mr. Dase; and the next year 250 by Dr. Clausen of Dorpat. In 1851 Mr. William Shanks of Durham calculated 315 decimals, which Dr. Rutherford verified and extended to 350. Mr. Shanks soon carried these to 527 decimals, of which 411 were confirmed by Dr. Rutherford. Finally in 1853 Mr. Shanks reached the number of 607 decimals, and gave the result in his "Contributions to Mathematics" (London, 1853).—When it was made evident that the arithmetical expression was impossible, it was still hoped by many that the ratio might be determined by geometrical construction; and the bare possibility of this, which a few mathematicians have admitted, has given encouragement to some to seek the solution in this direction. But this, too, is now generally admitted to be impracticable.—Little benefit has resulted from the vast amount of time and labor that have been expended upon this famous problem. Wallis, investigating it at a time when the nature of the subject was not so well understood, and the investigation was consequently a proper one, was led to the discovery of the binomial theorem; but most of those who have since interested themselves in the question understood too little of the mathematical sciences to avail themselves of any opportunity that might be presented of increasing the means of mathematical research. The academy of sciences at Paris in 1775, and soon after the royal society in London, to discourage this and other similarly futile researches, declined to examine in future any paper pretending to the quadrature of the circle, the trisection of an angle, the duplication of the cube, or the discovery of perpetual motion.—The fullest and latest *resumé* of the history of the quadrature of the circle is to be found in Knight's "English Cyclopædia" (London, 1861).

QUADRIO, Francesco Saverio, an Italian scholar, born in the province of Valtellina in 1695, died in Milan in 1756. At the age of 20 he entered the society of Jesus, taught philology at Padua and theology at Bologna, preached at Venice and Modena, and at Padua engaged in the work of writing a general history of poetry in all ages and countries, which was completed after many years under the title of *Storia e ragione d'ogni poesia* (7 vols. 4to., Bologna and Milan, 1741-'52).

QUADRUMANA (Lat. *quatuor*, four, and *manus*, hand), a division of mammals including the apes or monkeys and lemurs, so called from their having a grasping hand on each of the 4 extremities, as distinguished from the *bimana* or the human races in which the anterior limbs only have hands. The characters of the different families are given in the articles Ape, Baboon, Chimpanzee, Gorilla, Lemur, Lori, Macaque, Marmoset, Monkey, and Orang-Outang. While the chimpanzee and gorilla approach the human type in many points of organization, being however more distant from man than is the rudest savage from the most cultivated scholar, others, like the lemurs, seem to form the links between bats, carnivora, or insectivora, and the monkeys proper; all are truly quadrupeds, for anatomical reasons given under Anthropology and Ape. For details on the anatomy and physiology and extensive bibliography of the order, see the article "Quadrumana" by Vrolik in vol. iv. of Todd's "Cyclopædia of Anatomy and Physiology" (London, 1848). They are almost exclusively confined to the tropical regions of the earth, and feed mostly on vegetable food in a state of nature, even the largest and most ferocious species, and are generally arboreal in habit and gregarious. The quadrumana have in a few instances been found fossil, in the tertiary strata of Europe and Asia, and in the caverns of Brazil; their remains have been discovered in England and France, in a climate where now they could not exist in a wild state; it is worthy of notice that their fossil distribution is in one respect the same as the present, the *catarrhini*, or those with a thin partition between the nostrils and 32 teeth, being peculiar to the old world, and the *platyrrhini*, with more widely separated nostrils and 36 teeth, to America. In 1860 two new varieties, if not species, of large anthropoid apes were described by Mr. P. B. Du Chaillu, who discovered them in equatorial Africa. One of these is a chimpanzee-like animal, called *kooloo-kamba* by the natives from its peculiar cry, and found in the mountainous region of the interior near the head waters of the Ovenga river, in the almost uninhabited Ashankolo range. The height is about 4½ feet, and the general color is black; the features are more human than in the chimpanzee or gorilla, the head being rounded, the frontal ridge not very prominent, the cheeks rather hollow with projecting malar bones, the muzzle not very full, and the chin rounded, resembling very much a black Chinaman; the face is surrounded by whiskers meeting under the chin, adding still more to the human expression; chest broad; the arms reaching below the knee and indicating great muscular strength, the hands long and narrow, the thumb very short, and the knuckles callous as in the gorilla; legs short and without calf, and toes free like the fingers, indicating its arboreal habits. This rare animal its discoverer names *troglodytes kooloo-kamba*. The other large ape is the bald-headed nshiego, named *T. calvus* by Mr. Du Chaillu; it is about 4½ feet high, of a general blackish color, with the lower part of the back grayish, and a tendency to the latter color in old age; the most striking peculiarity is the baldness of the top of the head, found even in young specimens; a very scanty beard under the chin; the face is black in the adult, but pale in the young. It is found in the interior of Africa, south of Cape Lopez, especially in the Camma country; it builds a shelter in trees 20 to 30 feet from the ground; it ties branches together with wild vines and attaches them in an umbrella-like form to the trunk at a convenient distance above a horizontal branch on which it rests and sleeps; the male lives under one shelter, and the female under another, on a neighboring but not contiguous tree; the horizontal branch is always high, and the first from the ground, probably to secure the animal against the leopard of the country. Both of these animals will be found more minutely described in Mr. Du Chaillu's "Explorations in Equatorial Africa" (8vo., New York, 1861).

QUÆSTOR (Lat. *quæro*, to accuse), the name given to two classes of officers at Rome, the *quæstores parricidii* and the *quæstores classici*. The former of these, who have sometimes been confounded with the *perduellionis duumviri*, had their origin in the time of the kings, although under which monarch is uncertain. Their duty was to bring accusations against any person charged with a capital offence, and if he were found guilty to execute the sentence. After the establishment of the republic, *quæstores parricidii*, who seem before to have been appointed only at critical periods, were elected regularly every year by the curies, on presentation of the consuls. After the decemvirate they were appointed by the centuries, and at the passage of the Licinian laws they ceased to exist, their functions being transferred to the *triumviri capitales* and also to the ædiles and tribunes. From their early disappearance from history they were frequently confounded with the *quæstores classici*, the officers who had the charge of the public money. These registered and exacted all fines, provided accommodations for foreign ambassadors and for persons connected with the republic by the ties of hospitality, took charge of the funerals and monuments of illustrious men who were buried at the public expense, and kept the books in which the copies of the senate decrees were registered, the original documents being in the care of the ædiles until the time of Augustus, when they were given into the hands of the quæstors. This office is said to have been instituted by Valerius Publicola, and could only be held by patricians until 421 B. C., when the number, which previously had been two, was doubled, and the choice was not confined to either order. It was not until 10 years later, however, that any plebeians were elected. Afterward the consuls in their campaigns were attended each by one quæstor, who originally took charge only of the sale of the spoils, but subsequently became the paymaster of the army. The two quæstors who remained at Rome were distinguished by the title *urbani*. In 265 B. C. the number of quæstors was raised to 8, one of whom resided at Ostia and had the important duty of supplying Rome with corn. After this the number varied. By Sylla it was raised to 20, and by Julius Cæsar to 40. In 49 B. C. the latter also transferred the administration of the public treasury to the ædiles, no quæstors being elected; and thenceforth the treasury was sometimes under the charge of the prætors, sometimes of prefects of the treasury, and sometimes again of the quæstors. During the empire the number of quæstors varied, and among them are mentioned those entitled *candidati principis*, whose sole duty was to read to the senate the communications which the emperor made to that body. From the reign of the emperor Claudius it became the custom of quæstors on assuming their office to give gladiatorial spectacles to the people, so that none but wealthy men were eligible; and the custom also prevailed in Constantinople, after it became a capital of the empire.—Every prætor or proconsul was attended in his province by a quæstor, who, beside being paymaster of the army, was charged with the raising of that portion of the revenue which was not farmed out to the *publicani*, and with the control of the latter also. When the quæstor died in the province, the prætor appointed a proquæstor in his stead; and when the prætor was away, the quæstor took his place, in which case he was attended by lictors. In the provinces of the Roman people, the quæstor had the same jurisdiction as the curule ædiles at Rome, and therefore the power to promulgate edicts; but in the provinces of the emperor there were no quæstors, their places being supplied by procurators. During the reign of Constantine, the title of *quæstor sacri palatii* was given to an officer in the imperial court, whose functions were somewhat analogous to those of a modern chancellor.—Any person who had held the office of quæstor was entitled to a seat in the senate, unless excluded by the next censors.

QUAGGA, a species of zebra, belonging to the asinine division of the horse family, and to the genus *asinus* as defined by Gray, characterized by a tail furnished with long hair only at the tip, the absence of horny warts on the hind legs, and a short and upright mane. The quagga (*A. quagga*, Gray) is about 4 feet high at the shoulders; the neck and anterior parts of the body are dark brown, elegantly striped with broad black bands; the rest of the body paler brown, belly and legs white; a dark median line on the back extending to the tail. This beautiful species associates in large herds with the gnu and ostrich, but not with other zebras, on the plains of S. Africa, and is rarely found north of the Gariep or Orange river; it is the most horse-like in structure of any of the group, having the form, light figure, and small head and ears of the horse, with the tail of the ass; its appearance is so equine that Buffon regarded it as a hybrid between a horse and a zebra. It is swift, and rather shy in its native state, strong, robust, and bold when attacked by hyænas or dogs; the voice resembles a barking neigh more than a bray, and has given to the animal the Hottentot name of quagga. It is the most easily domesticated of the zebras, and is docile, generally good-natured, and obedient, disposed to kick, however, at the sight of a dog; in 1827 a curricle drawn by two quaggas was one of the most attractive equipages in Hyde park, London. A little care on the part of man would probably render the quagga a very serviceable beast of burden, and under a climate where horses suffer both from the heat and noxious insects. Its flesh is eaten by the natives and by hunters, and is considered very good, though the fibre is coarse.

QUAIL, the common name of several genera of the partridge division of gallinaceous birds. The American quails constitute the sub-family of *odontophorinæ* or *ortyginæ*, which have a short, high, and arched bill, compressed on the sides, with obtuse tip, the upper overhanging the lower mandible, and the latter with two teeth on each side concealed when the mandibles are closed; the wings moderate, concave, and rounded; tarsi generally slender, shorter than the middle toe, and covered with divided scales; toes long, the inner shorter than the outer; claws slightly curved and acute. In the genus *ortyx* (Steph.) the head is without crest, the bill broad, the 3d quill nearly as long as the 4th, 5th, and 6th, which are longest; tail short, broad, and rounded; toes slender, slightly united at the base by membrane; hind toe moderate and slightly elevated. There are about a dozen species, found in North and Central America and in the West Indies; they seek their food on the ground among the leaves, eating grains, seeds, berries, and insects, which they swallow with small pebbles or fine sand. The common quail, or Bob White (*O. Virginianus*, Bonap.), is about 10 inches long, with an alar extent of 15; the general color above is brownish red, especially on the wing coverts, tinged with gray and mottled with dusky on the upper back; chin, throat, forehead, and line through the eyes and along the sides of the neck, white; a black band across the top of the head, extending backward on the sides, and from the bill below the eyes crossing on the lower part of the throat; below white, tinged with brown anteriorly, each feather with black bands; the female has not the black marks, and the white on the head is replaced by brownish yellow. It is found abundant in the eastern United States to the high central plains; the northern birds are largest and lighter colored, the southern with more black on the head, wings, and back; a smaller and more grayish variety in Texas has been separated as a species. The flight is rapid, low, and with numerous quick flappings. It takes to trees when alarmed, a flock dispersing in all directions and afterward coming together at the call of the leader. The males are very pugnacious, and in the breeding season utter the well known notes, "Ah Bob White," the first syllable rather low, but the others loud and clear; by some these notes are thought to resemble "more wet," and are therefore regarded as omens of rainy weather. The eggs are 10 to 18, pure white; the young run about as soon as hatched, but follow the old birds till spring, when they acquire their full plumage, pair, and breed; only one brood raised in a season. They rest on the ground at night, arranged in a circle with their heads outward, so that each can fly off in a straight line, if alarmed, without interfering with others; they are easily caught in snares, traps or driven into nets; they are difficult to raise from the egg, chiefly on account of the impossibility of obtaining the insects on which the young feed, but adults fatten well in captivity, eating grain, seeds, and berries; the flesh toward autumn is fat, juicy, and tender, white and highly esteemed; many perish from cold and hunger and from being imprisoned under the snow during severe winters. There is great confusion about the name of this bird; it is called quail in the northern states, but in the middle and southern partridge; where the former name prevails the ruffed grouse is called partridge, and where the latter this grouse is styled pheasant; as neither the name of quail, partridge, nor pheasant is properly given to any American bird, Mr. Baird proposes to call this species Bob White, and the *other* mountain grouse.—The genus *lophortyx* (Bonap.) has a crest of about half a dozen lengthened feathers, the shafts in the same vertical plane and the recurved webs overlapping each other; the bill weak; tail lengthened and graduated, of 12 stiff feathers, and nearly as long as the wings. Here belongs the beautiful California quail (*L. Californicus*, Bonap.), about 9½ inches long, with back and wings olivaceous brown, the secondaries and tertiaries edged with brown, breast and neck above plumbeous, the imbricated feathers on the latter with an edge and middle stripe of black; top of head brown, and crest black; throat black edged with white. This takes the place of the Bob White in California and Oregon.—The genus *callipepla* (Wagler) resembles the last, but has the crest of broad, short, soft, and depressed feathers. The scaly or blue quail (*C. squamata*, Gray) is 9½ inches long; the general color is plumbeous gray, whitish below; the feathers of the neck, upper back, and lower parts edged with black, producing the effect of imbricated scales; it is found in Texas. In this genus Gray *places* the plumed quail (*C. picta*, Gould), for which Mr. Baird has established the genus *oreortyx*; it is about 10½ inches long, with stout bill, crest of two straight feathers, and short broad tail; the general color is olivaceous brown, tinged above with rufous, and anterior part of the body grayish plumbeous; throat orange chestnut; posterior half of body beneath white, with chestnut brown central patch. It is found on the mountain ranges of California and Oregon, toward the coast. The genus *cyrtonyx* (Gould) has a very stout and robust bill, and the head with a broad soft crest of feathers; the tail is very short and of soft feathers; wings long and broad, the coverts and tertials concealing the quills; feet strong, toes short, and claws long. Massena's quail (*C. Massena*, Gould) is about 9 inches long, having the head riped with white, black, and lead color; olor black; feathers above streaked centrally ith whitish; wings with two series of round- d black spots, and lower parts and sides with ound white spots on a plumbeous ground. It found on the upper Rio Grande.—The Euro- ean quail belongs to the genus *coturnix* (Möhr.) f the partridge sub-family; in this the bill is hort, elevated at the base and arched to the ob- use tip; wings moderate, with the 2d to the th quills the longest; tail very short, pendant, nd mostly hidden by the coverts. There are bout 20 species, scattered over Europe, Asia, nd Australia, migrating in large flocks to arm regions in winter; some prefer cultivat- d districts, among tufts of grass, others rocky laces, and others elevated table lands; the food nd habits are as in other partridges. The Eu- opean quail (*C. communis*, Bonn.) is 8 inches ong, with an alar extent of 14; the upper arts are variegated with reddish, gray, and rownish black, with whitish longitudinal treaks; throat of male dark brown, and a ouble interrupted black band on the fore eck; throat of female yellowish gray; head ompletely feathered, with a white streak over he eyes. It is abundant in southern Europe, ndia, and N. Africa; it was well known to he ancients, who employed it as a fighting ird for their amusement; if the quails which erved as food for the Israelites in the desert were birds, and not locusts (as some maintain), hey probably belonged to this species. The otes of the male, especially in moonlight ights in summer, are very clear and pleasing, nd have acquired for it the specific name of *dactylisonans*. The Chinese quail (*C. Chinensis*, Edw.) is a smaller species, used in the East Indies as a fighting bird, and also for the singular purpose of warming their owners' hands in winter.—The *turnicinæ* or bush quails of the old world have a moderate and usually straight bill, short wings, and tail almost concealed by the dorsal feathers; tarsi strong; toes usually 3, long, and free at the base. In the genus *turnix* (Bonn.) the bill is curved, the tertials shorter than the primaries, and the 1st, 2d, and 3d quills equal and longest. There are more than 20 species of small size, found in southern Europe, India and its islands, Africa, Madagascar, and Australia; they frequent open places near rivers, keeping near the ground when flying, and running rapidly among the grasses; the eggs are usually 4. The *T. pugnax* (Lath.) of Java has the body varied with reddish, black, and white, beneath streaked with white and black, and throat black.

QUAKERS. See Friends, and also appendix to this volume.

QUAKING GRASS (*briza*), a genus of ornamental grasses of little agricultural value, but esteemed in gardens on account of their elegant spikelets, which, many-flowered, ovate or heart-shaped, flattish, tumid, the florets closely imbricated, are suspended on delicate pedicels and are easily agitated by the wind. The most conspicuous is the *B. maxima*, a native of Europe, very handsome and much cultivated; it is an annual, with softish, light green leaves, and numerous large and many-flowered spikes. Another species is the *B. media*, a perennial, with slender, tall stalks, darker green leaves, and many small, purplish spikelets, which hang in a graceful nodding manner. It occurs sparingly in pastures of Pennsylvania, and is not uncommon in the rocky lands near Salem, Mass. Other species are known, but these are the principal introduced into floriculture.

QUARANTINE (It. *quarantina*, Fr. *quarantaine*, a space of 40 days), a police regulation for the exclusion of contagious diseases from a city or state. Quarantines of a partial character were used in the maritime towns of Italy in the 15th century as a means of preventing the importation of the plague. In 1720, when the same disease ravaged Marseilles, the French government established a rigorous quarantine, and the usage is now general in all commercial countries. The introduction from foreign ports of yellow fever, cholera, the small pox, and other epidemics, is thus resisted by detaining ships, passengers, and goods at the frontiers, without communication with the people, until they are believed to be no longer capable of communicating the disease. The period of such detention varies according to circumstances and special laws, and by no means extends in all cases to the original 40 days from which the name of the regulation is derived.

QUARLES, Francis, an English poet and prose writer, born at Stewards, Essex, in 1592, died Sept. 8, 1644. He was educated at Christ's college, Cambridge, studied law at Lincoln's Inn, was cup-bearer for a while to the queen of Bohemia, and in 1621 went to Dublin, where he became secretary to Bishop Usher. Returning to England after several years' absence, he was appointed chronologer to the city of London, and devoted himself to literary labors until the revolution plunged him into difficulties from which he never recovered. His best known writings are his "Divine Emblems" (1635) and "Enchiridion" (1641). The former, imitated from the *Pia Desideria* of the Jesuit Herman Hugo, consists of symbolical pictures with short moral lessons in verse; the latter is a collection of brief essays and aphorisms, in vigorous and occasionally eloquent language. Among his poetical works are: "Feast for Worms, or the History of Jonah;" "Argalus and Parthenia;" "Quintessence of Meditation;" "History of Queen Esther;" an "Alphabet of Elegies," in memory of his friend Archdeacon Aylmer; "Hieroglyphics;" "The Virgin Widow," a comedy; "The Shepherd's Oracles;" "The School of the Heart," &c. In most of these works he evinces strength of thought and considerable wit, but in his excessive eagerness for effect he frequently becomes absurd and grotesque. His "Enchiridion" has been republished in Smith's "Library of Old Authors;" the "School of the Heart" and "Hieroglyphics" were reprinted in London in 1858, and the "Emblems" in 1859.—JOHN, son of the preceding, born in Essex in 1624, died of the plague in London in 1665. He was educated at Oxford, where he assisted in defending the town against the parliamentarians, was afterward a captain of the royal forces, and retiring to London after the king's final overthrow commenced author for a living. He wrote "Regale Lectum Miseriæ, or a Kingly Bed of Misery;" "England's Sonnets;" "Fons Lachrymarum, or a Fountain of Tears;" a continuation of the "History of Argalus and Parthenia;" "Divine Meditations," and other works in verse and prose. Some of his poetry is well worth preserving, though inferior to his father's in originality.

QUARRY, an open excavation made for obtaining rocks, as granite, sandstone, marble, limestone, and slates; so named from the fact that the stones are usually squared (old Fr. *quarré*) for their use in building.

QUART, a measure of capacity, the fourth part of a gallon. (See GALLON.)

QUARTZ, the most abundant of all minerals, existing as a constituent of many rocks, as the granitic, the micaceous and silicious slates, composing of itself the rock known as quartzite or quartz rock, and some of the sandstones and pure sand, forming the chief portion of most mineral veins, and found interspersed in crystals and crystalline fragments throughout many rocks, and especially in their fissures and cavities. In composition it is silica in that state in which it is insoluble in strong potash solutions. Often the mineral is uncontaminated with any foreign intermixture, and then appears in clear transparent crystals like glass or ice. The presence of a little oxide of manganese gives to these a violet tinge, and they are then known as amethyst. Other impurities which variously affect the appearance and properties of quartz, even in the small quantities in which they enter into its composition, are oxide of iron, alumina, oxide of nickel, &c. Through all its varieties quartz is distinguished by the same chemical properties and degree of hardness. This, which enables the mineral to scratch glass and to give fire when struck with steel, is represented by 7 of the scale of hardness. Its specific gravity is 2.5 to 2.8. Its lustre is vitreous, its colors various according to the impurities present, and its fracture conchoidal. It is fusible only at the intense heat of the oxy-hydrogen blowpipe, and of the furnaces lately invented by M. H. St. Claire Deville; but it is readily fluxed with soda or lime. The quartz glass obtained by Deville, amounting to 30 grammes, possessed a density of only 2.2, or about ¼ less than that of the crystallized quartz from which it was melted. The colorless transparent crystals impress circular polarization upon a ray of plane-polarized light. They exhibit double refraction when the object is observed through two faces which are not parallel to each other. Milk-white varieties often give a phosphorescent light when rubbed together in the dark. The primary form of the crystal, which is very rarely seen, is a rhomboid. The common form is a hexagonal prism terminated by hexagonal pyramids. The crystals occur in groups of great beauty and of all sizes up to single crystals of several hundred pounds' weight. In the museum of the university at Naples is a group of nearly half a ton weight. In Milan is a crystal 8¼ feet long and 5½ in circumference, estimated to weigh 870 lbs. A crystal in the museum of natural history in Paris is 3 feet in diameter and the same in length, and weighs 800 lbs. Occasionally immense quantities of crystals are found collected together in cavities in the rocks and in caves, loose and incrusting the walls. Such a collection, discovered at Zinken more than a century ago, produced 1,000 cwt. of rock crystal, which at that period, when the article was more highly valued than at the present time, brought $300,000. In the United States some rich deposits have been met with in the Ellenville lead mine, Ulster co., N. Y., and in some of the southern gold mines; and large groups of fine crystals have been found in Moose mountain, N. H., and in Waterbury, Vt. Little Falls on the Mohawk in New York is a famous locality for the purest transparent crystals of complete forms, and they are met with in other places also in the same region, occurring in the cavities of the calciferous sand rock, which overlies the Potsdam sandstone. Trenton Falls also furnishes perfect transparent crystals, which are sometimes 5 inches long and contain drops of water. These are occasionally recognized in quartz crystals of various localities. In St. Lawrence and Jefferson cos., N. Y., in the deposits of iron ore, quartz crystals are found of dodecahedral forms. In Orange co., 4 m. E. of Warwick, they occur in the primary form. Many of the varieties of quartz are known by other names, under which they have been particularly described in this work. (See AMETHYST, AGATE, CARNELIAN, CATS' EYE, CHALCEDONY, FLINT, GEODE, JASPER, &c.)—Clear crystalline quartz, called rock crystal, was in former times esteemed as a beautiful material for ornamental objects. It was cut into vases, cups, lustres, &c., many of which are still preserved as curiosities. In the museum of the Louvre are great numbers of them, some belonging to the times of the ancient Greeks and Romans, but more generally of the period of the middle ages. The perfection to which the manufacture of glass and pastes has been brought and the cheapness of these materials have almost completely taken away the value of rock crystal, which requires a great amount of labor in its cutting and polishing, and after all is not really superior to the artificial products. Some use is however still made of it, as for buttons, seals, breast pins, &c. It is procured from Madagascar, Switzerland, and Brazil. In Switzerland quartz veins which occasionally yield rich cavities of crystals are regularly mined for this product. From Madagascar large clear masses are received which sell for from $1 to $10 per pound. When cut and set by the jewellers the stone is commonly sold as white topaz, and sometimes as "California diamonds." In the arts lenses of pure quartz are used for object glasses of astronomical telescopes; and by the French lenses are cut to give the double image by refraction, and set in telescopes for estimating distances by means of this property. Pure quartz is largely employed in the manufacture of glass, and is commonly obtained for this purpose in the form of sand. Quartz rock of the metamorphic group is sometimes found of a granular structure and crumbly consistency, and of great purity, well adapted for this application. (See Glass.) Varieties of quartz of a cellular texture and great tenacity are used for millstones, the roughness and hardness of their surface and sharpness of the edges of the cells giving them a powerful grinding capacity combined with great durability. (See Buhrstone.) Sandstones and conglomerates composed of quartz pebbles are refractory fire stones, and are used for the hearths and inner walls of furnaces.

QUASSIA, the wood of the *simaruba excelsa* (De Cand.), *quassia excelsa* (Willd.), or *picraena excelsa* (Lindley), a lofty tree growing in Jamaica and the Caribbean islands, where it is known as the bitter ash. Quassia was originally obtained in Surinam from the *quassia amara*, a small branching tree or shrub, all parts of which are excessively bitter, and of which the root bark and wood were formerly officinal for their tonic properties. The substance was brought into notice as a medicine about the middle of the last century by a negro of Surinam named Quassi, and being taken thence to Stockholm in 1756 it soon became a very popular medicine in Europe. But as the original source of supply failed, recourse was had to the similar product of the *quassia excelsa*, with which the demand has since been met. It is received in sticks of an inch to nearly a foot in diameter, which are pieces of the branches and stem; and in the shops these are kept split in small pieces or rasped. The wood has an intensely bitter taste, and imparts its properties to water and alcohol; and of late years drinking cups have been made of it for the use of invalids. Its decoction yields a peculiar bitter crystallizable principle, named quassine. The properties of quassia are those of the simple bitters, and as a medicine it is adapted to cases of dyspepsia and the debilitated state of the digestive organs which sometimes succeeds acute disease. The decoction was formerly used in England by some of the brewers as a substitute for hops, but this is now prohibited under severe penalties. When sweetened it makes an efficacious fly water.

QUATRE BRAS. See Waterloo.

QUATREFAGES, Jean Louis Armand de, a French naturalist, born in Valleraugue, department of Gard, Feb. 6, 1810. He was graduated doctor in medicine and science at Strasburg in 1829, published papers *Sur les aérolithes* (1830), and *De l'extroversion de la vessie* (1832), and, while assistant professor of chemistry in the medical faculty at Strasburg, wrote extensively for scientific periodicals. In 1839 he was appointed to the professorship of zoology at Toulouse, but soon resigned it to repair to Paris, where he found great facilities for study. Among his publications, most of which have appeared in the *Annales des sciences naturelles*, are: *Considérations sur les caractères zoologiques des rongeurs* (4to., 1840); *De l'organisation des animaux sans vertèbres des côtes de la Manche* (1844); *Recherches sur le système nerveux, l'embryogénie, les organes des sens et la circulation des annélides* (1844-'50); *Sur l'histoire naturelle des tarets* (1848-'9); and *Sur les affinités et les analogies des lombrics et des sangsues* (1852). He published in the *Revue des deux mondes*, under the title of *Souvenirs d'un naturaliste*, a narrative of scientific travels along the shores of the Atlantic and the Mediterranean. Part of these *Souvenirs* have been printed separately (2 vols. 12mo., 1854; English translation, 2 vols., London, 1857). In 1850 he became professor of natural history in the *lycée Napoléon*, in 1852 member of the academy of sciences, and in 1855 professor of anatomy and ethnology in the museum of natural history.

QUATREMÈRE, Étienne Marc, a French orientalist, born in Paris, July 12, 1782, died Sept. 18, 1857. He was a pupil of Sylvestre de Sacy and Chézy, acquired a knowledge of the Hebrew, Chaldaic, Coptic, Syriac, Persian, Turkish, and Armenian languages, in 1807 received a subordinate office in the MS. department of the imperial library, in 1809 was appointed professor of Greek in the faculty of letters at Rouen, in 1815 succeeded Laporte-Dutheil as a member of the academy of inscriptions, in 1819 was called to the college of France to teach Hebrew, Chaldaic, and Syriac, and in 1827 became professor of Persian at the school of the living eastern languages. He left many valuable works. To him is mainly owing the identification of the modern Coptic with the language of the ancient Egyptians, which gave the first clue to the interpretation of the hieroglyphics. His library, one of the most complete in oriental literature ever collected, was bought by the king of Bavaria and removed to Munich.

QUATREMÈRE DE QUINCY, Antoine Chrysostome, a French archæologist and writer on æsthetics, second cousin of the preceding, born in Paris in 1755, died in 1849. In 1785 a paper *Sur l'architecture égyptienne* secured for him a prize from the academy of inscriptions; he was then engaged as a contributor to the *Encyclopédie méthodique*, for which he wrote a "Dictionary of Architecture" (3 vols. 4to., 1795-1825). On the breaking out of the French revolution he sided with the moderate party, and was appointed a member of the commune of Paris, and elected a deputy to the legislative assembly in 1791. Imprisoned for 18 months during the reign of terror, he owed his life to the overthrow of Robespierre, became one of the council of 500 in 1797, and was suspected of being an active royalist. On the 18th Fructidor his name was placed on the proscribed list by the republican directors; but he avoided transportation by concealment. He reappeared under the consulate, became first a member and then chief secretary of the municipal council of the Seine, and under the Bourbons was appointed superintendent of public monuments in 1815, and in 1818 professor of archæology in the royal library. In 1820 he took his seat in the chamber of deputies, but he soon abandoned politics. He had early been admitted to the academy of inscriptions, and afterward to that of fine arts, of which from 1816 to 1839 he was secretary-general. Among his voluminous works are: *Le Jupiter Olympien* (fol., Paris, 1814), a restoration of the great work of Phidias; *De l'imitation dans les beaux arts* (1823; English translation by J. C. Kent, 8vo., 1837); and *Histoire de la vie et des ouvrages de Raphaël* (1824).

QUEBEC, a fortified city and port of entry of Canada East, now (1861) actual capital of Canada and the residence of the governor-general of the British possessions in North America, situated on the N. W. bank of the river St. Lawrence, at its confluence with the St. Charles, about 360 m. from the gulf of St. Lawrence, and 180 m. N. E. from Montreal, in lat. 46° 49′ 12″ N., long. 71° 16′ W.; pop. in 1861, exclusive of the suburbs, 51,134, nearly ⅔ of whom are of French extraction, and ⅘ Roman Catholics. The French is the prevailing language here as in Lower Canada generally. Quebec is built upon the slope of an elevated promontory or table land, which forms the left bank of the St. Lawrence for about 8 m., and has on that side an almost precipitous face, but declines more gradually to the St. Charles. This promontory is called Cape Diamond, from the numerous quartz crystals found in its rocks. The city is divided into the upper and lower towns. The upper town extends along the table land already mentioned, and inclines toward the river St. Charles, in a N. W. direction. It is surrounded by a wall 2¾ m. in circuit, mounted with cannon and having 5 gates. Here are situated the great hotels, the finest stores, the theatre, the parliament house, the bureaux of the officers of state, the court house, the city hall, &c. It is the quarter of fashion, and the residence of capitalists and officers of government. From its ramparts and terraces, the views of the lower town, the rivers, the island of Orleans, Point Levi, and the adjacent country are among the finest in America. To the W. of the walls, and extending along the heights, lie the populous faubourgs of St. Louis and St. John, reaching far beyond the official limits of the city, in lines of elegant country seats, surrounded by trees and gardens. At some distance from the barriers of these faubourgs two commemorative columns rise on the celebrated plains of Abraham; one, of stone, surmounted by a fasciculus of arms, is dedicated to the memory of Gen. Wolfe, who fell at this point; the other, of bronze, is consecrated to the memory of the soldiers who shed their blood in the second battle on the plains of Abraham. The citadel, which is built upon the culminating point of the cape and commands the whole city, is 345 feet above the level of the river. It covers about 40 acres, and is regarded as the Gibraltar of America. The approach from the west, in the direction of the plains of Abraham, is defended by 4 martello towers 500 or 600 rods apart, and placed about ½ of a mile from the walls of the city. The lower town lies at the foot of the cliff along the banks of the rivers, upon an alluvial soil, and is bordered with wooden quays. This is the seat of the principal business of the city, and here are to be found the great commercial houses, banks, insurance offices, the exchange, the custom house, &c. During the season of navigation, this quarter of the city presents a scene of great activity. The docks for the river vessels, the breweries, distilleries, foundries, gas works, tanneries, soap manufactories, and ship yards are upon the banks of the St. Charles, in the faubourg of St. Roch. This large quarter, though inhabited mainly by the working population, has some fine streets and elegant stores. The ascent from the lower to the upper town is made by flights of steps and by steep winding streets.—Quebec has many fine buildings. The custom house, on the bank of the river, is an imposing Doric edifice with a dome and a façade of noble columns, approached by a long flight of steps. Quebec is the seat of a Roman Catholic archbishop and of an Anglican bishop. The interior of the Catholic cathedral, the chancel of which is copied from the apsis of St. Peter's at Rome, is much admired; the walls are adorned with paintings, one of which is a superb Vandyke. The chapel of the seminary, near the church, has the best collection of religious paintings in America. The Protestant cathedral, a plain gray edifice surmounted by a tall spire, stands in the centre of a large square, enclosed with an iron fence. To the S. E. is the parade ground, a central point, adorned with a fine fountain; and to the S. of this is the Durham terrace, which travellers pronounce the finest point of view in the world. The garden of the fortress, another fine promenade, has an obelisk erected in 1828 to the memory of the two heroes, Wolfe and Montcalm. Montcalm's remains are buried in the chapel of the convent of the Ursulines, but the body of Wolfe was conveyed to Westminster abbey. The Chalmers church, the Wesleyan church (in the flamboyant style), and the chapel of the gray sisters, are good specimens of Gothic church architecture. The marine hospital, built after the model of the temple of the Muses on the banks of the Ilissus, the archbishop's palace, the university of Laval, the theatre, and the city hall are also worthy of notice.—Quebec has several scientific and literary societies and institutions. The literary and historical society, founded in 1824, has a good library, and a collection of records of the realm in 80 or 90 folio volumes, with many historical manuscripts; but it suffered a severe loss in the burning of a part of its museum and library in the fire of Feb. 1854. There are beside this several institutes, reading rooms, and library associations. The merchants' exchange has a large reading room, well supplied with newspapers and periodicals. The legislative library has over 60,000 volumes, and a valuable collection of historical manuscripts. The educational institutions are numerous, and highly creditable to the city. The university of Laval, opened in 1854 in connection with the seminary of Quebec, an old theological institution founded in 1663 by the first Catholic bishop, Mgr. Laval, has buildings valued at $400,000, a library of 20,000 volumes, a cabinet of physical science, an anatomical museum, &c. The law department has 6 professors, and the medical 6. The faculties of arts and theology, not yet fully organized, are to have 16 chairs. The high school of Quebec (Protestant) has 6 professors, 200 students, and a library of 1,200 volumes. The college of St. Michel has 5 lay Catholic professors and 142 students; and the college of Notre Dame de la Victoire, conducted by the order of Christian Brothers, has 13 professors and 345 students. There are 5 convents with 64 teachers and over 1,900 female pupils, and 23 academies and private schools. There are 8 newspapers published in Quebec, 2 of which are daily, 5 tri-weekly, and 1 semi-weekly; there is also a monthly literary journal. The principal benevolent institutions are the lunatic asylum, the marine hospital, and the Hôtel Dieu. The city is supplied with an abundance of pure water from Lake St. Charles, just above the fall of Lorette, 9 m. distant.—The St. Lawrence is about ¾ of a mile (1,314 yards) wide opposite Cape Diamond, but the mouth of the St. Charles forms with it a basin nearly 4 m. long and more than 1½ m. wide. The depth of the water is about 28 fathoms. The ordinary tide is 17 or 18 feet at new and full moon; but the spring tides attain a height of 23 or 24 feet. The harbor is safe and commodious, and the largest vessels can lie at the wharfs. The steamship Great Eastern during the summer of 1861 visited Quebec, and lay at anchor at the foot of the citadel. In the latter part of December the river is closed by ice, and navigation ceases till the latter part of April, when the ice usually disappears very suddenly; steamers arrive from Montreal about April 25, and sea-going vessels about a week later. There is a regular line of steamers plying between Quebec and Gaspé and the provinces of the gulf, and two lines of royal mail steamers between the city and British ports. There is also a steam ferry connecting the city with the terminus of the railroad S. to Point Levi and Richmond, which is a branch of the grand trunk line. Telegraphic lines also connect it with the principal cities of Canada, the gulf colonies, and the United States.—Quebec is a free port. From the annual official "Tables of the Trade and Navigation of the Province of Canada," we compile the following statistics of its commerce for 1858, 1859, and 1860:

Arrivals.				Departures.			
Years.	Ships.	Tons.	Men.	Years.	Ships.	Tons.	Men.
1858..	[illegible]	[illegible]	[illegible]	1858..	[illegible]	[illegible]	[illegible]
1859..	970	[illegible]	[illegible]	1859..	[illegible]	[illegible]	[illegible]
1860..	1,252	[illegible]	[illegible]	1860..	[illegible]	[illegible]	[illegible]

Of the arrivals in 1860, 836 vessels came from Great Britain, 176 from the English colonies, 24 from the United States, and 206 from other foreign countries; 548 brought cargoes, and 704 were in ballast. Of the departures, 1,166 were destined to the British islands, 144 to English colonies, 4 to the United States, and 9 to other foreign countries. Beside this movement by sea, there came from the United States in 1860, by way of the lakes and river, 3 steamboats and 22 barks, with a tonnage of about 4,119; and the departures by the same interior route were 2 steamboats and 27 barks, tonnage 5,427. Quebec is the principal centre of maritime commerce in British North America, and one of the largest timber and lumber ports on the American continent. But while its exports are larger than those of any other city in Canada, its imports are below those of Montreal and Toronto. The following are the imports and exports of the last 4 years:

	Imports.	Exports.
1857	[illegible]	[illegible]
1858	[illegible]	[illegible]
1859	[illegible]	[illegible]
1860	[illegible]	[illegible]

The principal articles of importation are woollen, cotton, and silk goods, iron, hardware, coal, groceries, and salt. More than ⅘ of the whole amount of imports comes from Great Britain; the goods brought from the United States amounted in 1860 to $687,567. The exports consist principally of ships, lumber, and grain. The ships built at Quebec are renowned for their beauty, solidity, and sailing qualities. The number and tonnage of vessels propelled by sails and steam, built at Quebec for the last 4 years, are as follows:

	Ships.	Tons.
In 1857	64	[illegible]
" 1858	[illegible]	[illegible]
" 1859	48	[illegible]
" 1860	[illegible]	[illegible]

In 1860 the amount of lumber exported was 596,995 tons, of the following kinds and values: white pine, $2,468,736; red pine, $507,803; oak, $271,490; elm, $206,607, &c. The average exportation of lumber during the last 5 years has been about 500,000 tons. The other principal exports were: deals, $1,591,149; standard staves, $310,600; masts, $73,420; laths, $36,264; spars, $24,006; flour, $298,724; wheat, $30,199; coin and bullion, $59,-

178. The timber, deals, and cabinet work are sent mainly to Great Britain, and the breadstuffs to the English colonies of North America. There are some manufactories of distilled and fermented liquors, leather, tobacco, soap, &c. The city has two banks of circulation, with a paid-up capital of $1,682,863, and authorized $4,000,000; circulation, $878,828. It has also branches of 5 foreign banks, and 16 insurance offices.—The municipal government of the city consists of a mayor and 24 councillors. It has one representative in the legislative council, and 8 deputies in the house of assembly. Quebec is also the county seat of the county of Quebec; area, 16,440 sq. m.; pop. 27,951, aside from that of the city.—Quebec was founded by Samuel Champlain in 1608. It was taken by the English in 1629, and restored to France by the treaty of 1632. In 1636 it had 100 inhabitants. It was the colony of a concessionary company, who did not fulfil their promises to the settlers, and hence its growth was slow. The magistrate, named by the company, was called a syndic, and had powers similar to those of a mayor. The king, dissatisfied with the management of the company, took the colony into his own hands, and in 1663 appointed a governor, and created the sovereign council of Quebec, who were charged with its government. During the war of the league of Augsburg, the neighboring English colonies made an unsuccessful maritime expedition against it (1690). In 1711 the attempt was renewed, with no better success. The first attempt at erecting stone fortifications was made after the first of these attacks, the place having been previously protected only by palisades. In 1734 it had, including its suburbs, only 4,603 inhabitants. In 1759, during the 7 years' war, the English Gen. James Wolfe attacked the city and bombarded it. On Sept. 13, 1759, took place the first battle of the plains of Abraham, in which both the contending generals fell, and England gained at one blow an American empire. On Sept. 18 Quebec capitulated after a siege of 69 days. The French attempted its recapture, and in the following spring the 2d battle of the plains of Abraham was fought, and victory sided with the French colonists; but at the treaty of peace in 1763 Louis XV. ceded the whole of New France to the English. Quebec rose slowly from its ashes, though its commerce increased. In 1764 the first newspaper, the "Quebec Gazette," published in two languages, made its appearance. In 1775 the city had only 5,000 inhabitants. In 1776 a small American force under Gen. Montgomery attempted its capture, but failed, with the loss of about 700 men and their commander. In 1792, the year of the inauguration of the representative system in Canada, the first Lower Canadian parliament was convoked at Quebec, and the city remained the seat of government for the lower province till the union of the Canadas in 1840. During this period its growth was steady and mod-
erately rapid; in 1844 its popul
82,876, beside 2,797 in the suburbs. T-
rible fires occurred in 1845, at a mo
terval, in the faubourgs of St. Roch
John; nearly 3,000 houses were bur
property to the amount of more than $
000 was destroyed. These quarters ha
been rebuilt of brick and stone. In 1
seat of government was returned to Q
for 4 years, under the arrangement fo
nating capitals adopted in 1849. It is s
capital, and will probably remain so
new buildings are completed at Ottawa

QUEDA, or KEDDA, a native sta
W. coast of the Malay peninsula, boun
by the Siamese territory of Ligor, E
Malay state of Patani, S. by the state o
and the British province of Wellesley,
by the strait of Malacca; extreme leng
150 m., average breadth 50 m.; area,
m.; pop. about 21,000. A chain of isl
tends along the coast, the largest of wh
Lang-kaive and Trutao; but large ves
obliged to anchor about 4 m. from the
The country is drained by numerous r
of which are navigable by boats of con
size, but they are all obstructed by bars a
mouths. A great deal of the surface is le
there are several mountains, the most
of which is Queda peak, 5,000 feet a
sea. Gold, tin, and iron are found. T
is particularly fertile. Elephants are nu
merous, and are frequently exported to
The inhabitants consist of Malays, S
negritos, and some immigrants from the E
of Hindostan and China. Queda had fo
a considerable trade, the chief exports
pepper, rice, and about 150 tons of tin an
The country was overrun by the Siame
1821, who occupied it for several years
then abandoned it after ⅔ of the populatio
been killed or driven into exile. Capital, Q
da; pop. about 2,000.

QUEEN (Goth. *queins*, *quens*, a wom
wife; Sax. *cwen*, *quena;* Gr. *γυνή*, a w
the wife of a king, or a woman who is
sovereign of a kingdom. In the former c
city she is regarded in most countries as a
son of dignity only inferior to that of her
band, and possesses all the privileges enjoy
a *feme sole*. Thus in England she can re
grants from or make them to her husband
purchase or convey land without *his* co
rence, can sue and be sued alone, and di
of her property by will. She has a sep
household and separate courts and offic
exempted from paying tolls and amercements
and has other extraordinary privileges; and
compass or imagine her death, or to violate
defile her person, even with her consent
treason. If accused of treason *herself*, s
tried by the peers of parliament. She is
entitled to be crowned with full regal sole
ties. In other respects she is on a footing
equality with the subjects of her husband
accordance with the maxim of the Roman la

esta legibus soluta non est. As a sovereign ess—a signification not originally compre- ed in the term queen—she possesses all attributes of a king. In France, where by Salic law a female cannot succeed to the ne, the mother of a sovereign has some- s exercised royal authority during the mi- y of her son, in which case she has been d the queen regent. The queen dowager e widow of a king, and as such enjoys most he privileges accorded to her during the ime of her husband. In England she does lose her rank, although she marry with a nmoner; but no one can contract a marriage h her without a special license from the reign. When the queen dowager is mother he sovereign, she is commonly called the en mother.

UEEN ANNE, an E. co. of Md., bordered y Delaware, W. by Chesapeake bay, and W. by Chester river, and drained by a num- of creeks, among which Tuckahoe is the gest; area, 400 sq. m.; pop. in 1860, 15,961, whom 4,174 were slaves. It has a rolling face and fertile soil. The productions in 0 were 697,159 bushels of Indian corn, ,003 of wheat, 59,885 of oats, 9,614 of rye, 730 lbs. of wool, and 97,183 of butter. There re 8 grist mills, 3 saw mills, 2 newspaper ces, 23 churches, and 729 pupils attending lic schools. Capital, Centreville.

UEENS, a S. E. co. of N. Y., in the W. t of Long island, bordered N. by Long nd sound and S. by the Atlantic ocean; a, 410 sq. m.; pop. in 1860, 57,391. Its sur- e is somewhat hilly; much of the soil is fer- , and nearly all is highly cultivated. The res are much indented by bays and inlets, l on the S. beach there are many small nds. The productions in 1855 were 337,685 hels of Indian corn, 102,217 of wheat, 199,- of oats, 71,019 of rye, 21,224 of buckwheat, .135 of potatoes, 51,395 tons of hay, and .983 lbs. of butter. There were 24 grist s, 7 saw mills, 5 newspaper offices, 73 rches, and 17,365 pupils attending public ools. It is intersected by the Long island road, and the Flushing railroad lies wholly hin the county. Capital, North Hempstead.

UEEN'S, a middle co. of Prince Edward nd, bounded N. by the gulf of St. Lawrence d S. by Northumberland strait; area, 756 m.; pop. in 1848, 32,111. It is deeply in- ted by a number of inlets and bays, by one which, Hillsborough bay, it is nearly inter- ed. This bay affords a safe harbor for the est ships. The surface is diversified and soil very fertile. Capital, Charlottetown.

UEEN'S, a S. W. co. of Nova Scotia, bor- ed S. E. by the Atlantic ocean, and drained Broad, Mersey, and Port Medway rivers; a, 950 sq. m.; pop. in 1851, 7,256. Its coast dented by a number of bays, and the in- or contains several beautiful lakes. Its sur- e is rugged, and the soil along the streams is le. Capital, Liverpool.

QUEEN'S, a S. co. of New Brunswick; area, about 1,500 sq. m.; pop. in 1851, 10,634. It is intersected by the river St. John, and drained by several of its tributaries, of which the more important are the Salmon river, the Washadon-rock, and the Nerepis. The St. John is navigable to Fredericton, 90 m. from its mouth. The Salmon flows into Grand lake, a beautiful sheet of water about 30 m. long and from 3 to 10 m. broad. Capital, Gagetown.

QUEEN'S, a S. E. county of Ireland, province of Leinster, bounded N. by King's county, E. by Kildare, S. by Carlow and Kilkenny, and W. by Tipperary; area, 664 sq. m.; pop. in 1851, 111,623. The principal towns are Mountmellick, Mountrath, Maryborough, and Portarlington. The surface is generally undulating, rising toward the N. W. into the Slieve-Bloom mountains, the highest summit of which is 1,734 feet above the sea. The principal rivers are the Barrow and Nore; and there is only one small lake in the county. Iron and copper ore are found; and anthracite coal mines are extensively worked. With the exception of the centre of the county, where there are extensive bogs, the soil is generally fertile. Queen's county returns 3 members to parliament, 2 for the county and one for Portarlington.

QUEENSTOWN, or COVE OF CORK, a town of Ireland, county Cork, situated on the N. side of Cork harbor, 9 m. S. W. from Cork; pop. in 1851, 11,428. There are no manufactures, and the town is supported principally by the naval and military establishments in its vicinity. The harbor is excellent. The name was changed from Cove to Queenstown in honor of a visit paid by Queen Victoria in 1849.

QUÉRARD, JOSEPH MARIE, a French bibliographer, born in Rennes, Dec. 25, 1795. He was placed in a bookseller's shop at the age of 12, and afterward was employed in the same business in Paris and Vienna, where he collected the materials for his first bibliographical work, *La France littéraire* (10 vols. 8vo., 1826–'42). This with its complementary publication, *La littérature Française contemporaine* (1837–'44), comprised a list of works printed in French since 1700, with biographical notices of the authors. So far, however, did the continuation promise to exceed its projected size, that the publisher took it by legal process, unfinished, out of Quérard's hands, and it was completed by others; and Quérard, mulcted in damages, passed several months in prison. He has since published various works, and projected an *Encyclopédie du bibliothécaire*, upon a very extensive plan. His most curious work is *Les supercheries littéraires dévoilées* (5 vols., 1845–'59), exposing the impostures, apocryphal authors, and plagiarisms in modern French literature.

QUERCITRON, the bark of the black oak, *quercus tinctoria*, used as a dye stuff. The black outer portion of the bark being removed, the inner portion is found to contain a coloring principle which stains the saliva yellow when the bark is chewed; this is extracted by boiling water, giving to it a brownish yellow color, which is deepened by alkalies and brightened by acids. The bark is largely employed in the United States as a dye, and it is also reduced to a coarse powder and shipped to Europe in great quantities for the same use, particularly in calico printing. When its decoction has been deprived of tannin by means of glue, a fine yellow color is obtained upon fabrics mordanted with alum, and various shades of olive with iron mordants. The coloring principle is called quercitrine, or from its acid reaction quercitric acid. Black oak bark is used for tanning also, but the yellow color is an objection to this use. Its astringent and tonic properties have led to its use in medicine, but white oak bark, having similar medical properties without the color, is preferred. On account of its tendency to irritate the bowels it is generally applied externally as a bath rather than internally, and is prescribed, particularly for children, in cases of cholera infantum, scrofula, intermittent fevers, &c.

QUERETARO, a S. state of Mexico, bounded N. by the state of San Luis Potosi, E. and S. by Mexico, and W. by Michoacan and Guanajuato; area, 1,820 sq. m.; pop. 180,000. It occupies a part of the plateau of the Cordillera, and is traversed by numerous mountain spurs; but though its general character is rugged, it contains much fertile land. The rivers are all small, and the Tula and Rio de Montezuma, which flow on the eastern frontier, are the only streams that deserve notice. Gold, silver, copper, quicksilver, tin, lead, and antimony are all found. Grain is extensively cultivated, and considerable numbers of cattle are reared. Woollen and cotton goods are manufactured, from materials produced within the state.—QUERETARO, the capital, is situated on a plateau 6,365 feet above the level of the sea, 110 m. N. W. from Mexico; pop. 47,570. It occupies the sides and summits of several hills. The streets are well laid out, the houses regular, and the city is considered next in rank to Mexico. The principal church is magnificently decorated. The city is supplied with water by an aqueduct 2 m. long, which crosses a plain upon arches 90 feet high, and in connection with a tunnel brings the water a distance of 6 m. The manufactures consist chiefly of woollen and cotton goods and leather. In 1848 the Mexican congress ratified the peace between Mexico and the United States at Queretaro.

QUERINI, ANGELO MARIA, an Italian scholar, born in Venice in 1680, died in 1755. He was of a patrician family, was educated at the college of the Jesuits in Brescia, and at the age of 17 became a Benedictine monk in Florence. In 1710 he set out on a tour through Europe, and travelled 4 years in France, England, Holland, and Germany. In 1721 he was made archbishop of Corfu, and in 1728 was transferred to the see of Brescia, created cardinal, and soon after made librarian of the Vatican. The remainder of his life was spent in Brescia. Voltaire dedicated to him his "Semiramis."

QUESADA. See XIMENES DE QUESADA.

QUESNAY, FRANÇOIS, a French physician and political economist, founder of the sect of the physiocrats, born near Montfort-l'Amaury, department of Seine-et-Oise, June 4, 1694, died in Versailles, Dec. 16, 1774. Although the son of an advocate, his early education was entirely neglected; but having a strong love of study, he found means to acquire a knowledge of Latin and Greek, and at an early age began the study of medicine. He first established himself in Mantes, from which place he returned to Paris about 1729 or 1730. There he became physician to Mme. d'Étioles, afterward the marchioness de Pompadour. In 1[illegible] he was made surgeon in ordinary to the king, then secretary of the royal academy of surgery, and in 1744 consulting physician to the king. He wrote a number of medical works, and finally devoted his attention to political economy. (See AGRICULTURAL SYSTEM, vol. i. p. 224, and POLITICAL ECONOMY, vol. xiii. p. 448.)

QUÉTELET, LAMBERT ADOLPHE JACQUES, a Belgian astronomer, statistician, and moral philosopher, born in Ghent, Feb. 22, 17[illegible]. When scarcely 18 years old he was appointed professor of mathematics in his native town, and 5 years later at the Athenæum in Brussels. In 1824 the king of the Netherlands sent him to Paris to complete his astronomical studies; and on his return home in 1826, he was charged with superintending the building of an observatory, receiving at the same time the directorship of that institution, which he still holds. Between 1827 and 1829 he visited England, Scotland, Germany, Switzerland, and Italy. He is now perpetual secretary of the academy of sciences of Belgium, and corresponding member of the French institute. He has published *Astronomie élémentaire* (1826); *Recherches statistiques sur le royaume des Pays Bas* (1830); *Recherches sur la réproduction et la mortalité, et sur la population de la Belgique* (1832); *Statistique criminelle de la Belgique* (1832); *De l'influence des saisons sur la mortalité aux différents âges* (1838); *Sur la théorie des probabilités appliquées aux sciences morales et politiques* (1846); *Du système social et des lois qui le régissent* (1848); *Sur la statistique morale et les principes qui doivent en former la base* (1848), and since 1838 the *Annuaire de l'observatoire de Bruxelles*.

QUETZALCOATL. See HUASTECAS.

QUEVEDO Y VILLEGAS, FRANCISCO GOMEZ DE, a Spanish author, born in Madrid in 1580, died at Villanueva de los Infantes, Sept. 8, 1645. He was educated at the university of Alcala, and took a degree in theology at the age of 15. Having killed a nobleman in a duel for insulting a lady, he fled to Sicily, where the viceroy, the duke of Ossuna, gave him honorable employment, and on his removal to Naples made him minister of finance. He several times visited Madrid on diplomatic business, was pardoned for his former offence and received a pension. He was concerned in the conspiracy of the duke of Bedmar against Venice, and being in that city when the plot was discovered narrowly escaped with his life. After the disgrace of his patron (1620) he was kept a prisoner at his country seat, La Torre de Juan Abad, for 3½ years, on charge of libelling the government, but was released without trial. He published in 1631 a collection of the poetry of Luis de Leon, and a volume of "Poems by the Bachiller Francisco de la Torre," consisting of sonnets, odes, *canciones*, elegies, and eclogues, forming on the whole one of the best collections of miscellaneous poetry in the Spanish language, and being probably the work of Quevedo himself. In 1639, having made another visit to Madrid, he was seized one night at the house of a friend and thrown into a damp dungeon in a convent. His alleged offence was the composition of some satirical verses which had been laid under the king's napkin at dinner; and though it was soon discovered that another had written them, he was kept for 4 years in rigorous confinement. His papers having been twice seized by the government, the greater part of his works have never been printed. Among his published writings are: "On the Providence of God;" "God's Politics and Christ's Government," in which he endeavors to collect a complete body of political philosophy from the example of the Saviour; "On a Holy Life;" "The Militant Life of a Christian," &c. His most celebrated works are his prose satires, in which he exhibits more wit than delicacy. Of these we may mention his "History and Life of the great Sharper, Paul of Segovia" (1627); his treatise "On all Things, and many more;" "The Tale of Tales;" and "Letters of the Knight of the Forceps" (*Cartas del caballero de la Tenaza*, 1635). His *Sueños*, or "Visions," perhaps the most popular and effective of his satires, were published collectively in 1635 and translated into English by Sir Roger L'Estrange in 1708. They display a great deal of bold and original thought, but are coarse, overdrawn, and affectedly epigrammatic. A collection of Quevedo's poetry was made by Salas in 1648, and another by Aldrete in 1670, under the title of "The Spanish Parnassus, divided into its two Summits, with the Nine Castilian Muses." The best edition of his works is that of Sancha (11 vols. 8vo., Madrid, 1790–'94). A translation of the satirical works appeared at Edinburgh in 1798.

QUIBERON, a town of France, in the department of Morbihan, situated on a peninsula of the same name, which forms with several small islands a fine bay; pop. about 3,000. In 1746, during the war of the Austrian succession, the English attempted a landing here, but were repulsed with great loss. On June 27, 1795, a body of French royalists under D'Hervilly and Puisaye landed here from an English fleet, and took possession of Fort Penthièvre, by which the peninsula is defended; but they were defeated and driven into the sea by Gen. Hoche, and the prisoners massacred after capitulating.

QUICHÉS, KICHÉS, or UTLATECAS, a semi-civilized nation of Guatemala, which was allied in blood and language with the Kachiquels and Zotugils, and connected more or less intimately with all the members of the great Tzendal or Maya family. At the time of the conquest, the Quichés occupied the greater part of what is now called Los Altos, or the highlands of Guatemala, including the districts of Quiché, Totonicapam, and Quesaltenango. The traditions of the Quichés indicate that they sprang from the Toltecan stock, either as a colony or as a fragment thrown off at the time of the disruption of the Toltecan power, which had its seat in the centre of Chiapas, and of which Palenque was probably the capital. Their records, as transmitted to us by members of the royal house, who wrote them out immediately after the conquest, give a long array of kings, and imply a high antiquity for the nation. It seems that the Kachiquels and Zutugils were once embraced in the Quiché kingdom, and that their separation was the act of the king Acxopil, who had two sons, between whom he divided his power, retaining to himself the capital and surrounding regions, which preserved the name of Quiché. These three divisions, subsequently becoming hostile, were easily conquered by the Spaniards. Alvarado encountered his most vigorous resistance in Quiché, where the king, Tecum-Umam, went out to meet him, according to the chroniclers, with 232,000 men. They fought with great bravery, but musketry and cannon, and above all the terror inspired by the Spanish horse, proved too powerful for resistance with the rude means at their command. The battle lasted 6 days, the Indians fighting as they fell back with furious desperation. The king at last was slain by Alvarado, and the subjugation of the Quichés was completed.—The ruins of the city of Quiché, described by Mr. Stephens, attest the grandeur and power of this people, and give a fair support to the early accounts of their numbers. The district which they occupied is the best populated portion of Guatemala, and is almost purely Indian, the ancient language being still in general use. The people are described by M. Arthur Morelet as "an active, courageous race, whose heads never grow gray, persevering in their industry, skilful in almost every department of art, good workers in iron and the precious metals, generally well dressed, neat in person, with a firm step and independent bearing, and altogether constituting a class of citizens who only require to be better educated to rise equal to the best." Their language is regarded as a purer dialect than either the Kachiquel or Zutugil, with which it is compared by Fray Ildefonso Flores, in his *Arte de la lengua Kachiquel* (Guatemala, 1753).

QUICHUAS, one of the four great families into which the aboriginal Peruvians were divided, the others being the Aymaras (Inca), the Atacamas, and the Changos, each speaking distinct languages, but those of the Quichuas and Aymares having so many affinities as to be regarded as dialects of a common tongue. The Quichuas were the especial subjects of the Incas, and the nucleus of their empire, occupying the capital, Cuzco, and a vast extent of the surrounding country. Numerically they were the dominant race of Peru, and their language was the most widely diffused of any spoken in the empire. At this day they compose nearly three fourths of the Indian population of Peru and Bolivia. Physically they are short, with broad chests, and capable of long and severe exertion. Their complexion has not the coppery hue of the North American Indians, nor the yellow tinge of the Indians occupying the lower regions of South America, but may be described as olive-brown or bronze. Their color as well as their physical peculiarities have been ascribed to the fact of their occupying a country elevated from 7,500 to 15,000 feet above the sea, where the climate is always cool and dry. Their features are strongly marked, and according to D'Orbigny have a closer resemblance to those of the Mexicans than those of any other American nations, from which they are further distinguished as having the least beard. What is known as Peruvian civilization, art, and religion, attests their intellectual and moral characteristics and capabilities. Previous to the conquest they had made considerable advances in science, apparently without foreign aid or suggestions. They had a decimal system of numeration, a circumstance which widely distinguishes them from the Mexicans, whose system was vigintesimal. They had observed the solstices and equinoxes, and accurately determined the length of the solar year. "They cultivated poetry and music," says Prichard, "and the roundelays of the Incas were celebrated by the Spanish writers for their pathetic and beautiful simplicity. Their language was harmonious, graceful, and formed by the most artificial system of inflections and combinations. Their religion was, if we may apply such epithets to any uninspired faith, the mere result of the inward light of an untaught human mind, in the highest degree spiritual and sublime. They recognized in Pachacamac the invisible God, the creator of all things, supreme over all, who governed the motions of the heavenly bodies, and whom they worshipped without image or temple in the open air; while to the sun, his visible creature, they erected temples, honored him with costly gifts, and with rites performed by consecrated virgins." Some authors classify the ancient Peruvians under three heads: the Aymares (including the Quichuas and Aymares), the Chinchas (corresponding with the Changos of Prichard), and the Huancas or Atacamas.

QUICKSILVER. See Mercury.

QUIETISM. See Molinos.

QUILIMANE, or Kilimane, a town of the Portuguese territory of Mozambique, on the E. coast of Africa, situated on the left bank of the river Quilimane, the N. arm of the Zambesi, 15 m. from the sea, in lat. 17° 52′ S., long. 37° 1′ E.; pop. about 15,000. It is irregularly built, some of the dwellings being of [illegible] some of mud, and many of reeds and grass. Its chief exports are gold and ivory.

QUILLWORT, a submerged aquatic plant with rush-like or quilled leaves, proceeding from a common contracted stem (*cormus*), which emits roots from beneath. From its evergreen condition throughout the year, it has received the generic name of *isoëtes* (Gr. ισος, equal, and ετος, year). Its organs of propagation are lodged in chambered conceptacles (sporocarps) enclosed in the bases of the leaves, and filled with minute, irregularly spherical bodies (*oophoridia*), which at first cohere in fours. The quillworts belong to the natural order [illegible]*dropterides* or water ferns, and are cellular cryptogamous plants. The lake quillwort (*I. lacustris*, Linn.) is the most common form, and is found on the bottom of ponds and in [illegible] streams in New England. Other species are known in the southern and western states.

QUILOA, a town of E. Africa, on an island of the same name off the coast of Zanguebar, in lat. 8° 57′ S., long. 39° 37′ E.; pop. about 7,000. It has a fort built of mud and [illegible] and whitewashed, and is partly surrounded with walls. The streets are narrow, and many of the houses are two stories high; and there is a large mosque with 25 domes. At one time an extensive trade was carried on, but it is of little importance now. Quiloa forms a dependency of the sultan of Zanzibar. When the Portuguese navigators first visited that part of the world, Quiloa was a large town, and the capital of a prince who ruled over Sofala and Mozambique. In 1505 it was taken and burned by Francisco de Almeida, and the Portuguese afterward built a fort, but were compelled to abandon it in consequence of the unhealthy nature of the climate. It subsequently became a slave depot, and continued to be enriched by that traffic till the early part of the 19th century, when the island was captured by pirates from Madagascar, who held it until they were expelled by a force sent from Zanzibar by the imam of Muscat.

QUIN, James, an English actor, born in London, Feb. 24, 1693, died in Bath, Jan. 21, 1766. His grandfather had been lord mayor of Dublin, and his father removing to that city after his birth, James was educated at the university there, and when 20 years old went to London, and commenced the study of the law in the Temple. Having obtained an engagement at Drury Lane in 1717, he at first acted subordinate parts, but gained some reputation in the character of Bajazet. In 1721 he secured his fame by acting Falstaff in the "Merry Wives of Windsor," and greatly increased it in 1731 by excelling Barton Booth in the part of Cato; and on the appearance of Garrick in 1741, he stood at the head of his profession.

In 1748 he retired from the stage, thereafter residing at Bath, but in 1749 appeared in Thomson's tragedy of "Coriolanus." He played for the last time, as Falstaff, on March 19, 1753, refusing to play afterward because he had lost his voice. He received a pension from George III., whom in his youth he had instructed in elocution. He once released Thomson the poet from imprisonment in a sponging house, paying his debts to the amount of £100, although he was personally unacquainted with him at the time.

QUINARY SYSTEM. See Entomology, and Ornithology.

QUINAULT, Philippe, a French dramatist, born in Paris, June 3, 1635, died there, Nov. 26, 1688. He was the son of a baker, and was patronized by the dramatist Tristan l'Hermite. When about 18 years old he produced on the stage a 5-act comedy, *Les rivales*, which was received with applause. He studied law, got rich by marriage, assumed the title of counsellor before the parliament, and bought an office as auditor in the court of exchequer, and afterward a post in the royal household. In 1665 he produced his best comedy, *La mère coquette, ou les amants corrigés*. He was less fortunate in the serious drama, *Astarte*, his only tragedy which is now remembered, owing its notoriety to the ridicule of Boileau. In 1672 he became acquainted with Lully the composer, and wrote lyrical tragedies to which Lully furnished the music. In conjunction with Molière and Corneille, he wrote some parts of *Psyché*, an operatic ballet extemporized for one of the royal festivals at Versailles. He was a member of the French academy. His complete works were published in 1739 and 1778 (5 vols. 12mo.); his *Œuvres choisies* in 1842 (2 vols. 8vo.).

QUINCE, the fruit of a low, straggling tree (*Cydonia vulgaris*, Persoon), belonging to the natural order *pomaceæ*, which likewise includes the medlar, apple, pear, &c. (See Pear.) The common quince tree has a crooked stem, rising to the height of 8 to 15 feet; irregular and twisted branches, its bark smooth and brownish black; leaves ovate, obtuse at the base, entire, dusky green above, tomentose beneath; the flowers large, the calyx tomentose, and the sepals serrulated and somewhat leafy; the corolla of 5 pale red or white petals, which are no longer than the sepals; stamens 20 or more in a single row; fruit large, globular, oblong or pear-shaped, of a rich orange or yellow color when ripe, and emitting a peculiarly pleasant smell, but which to many persons is disagreeably strong. The classical generic name of the quince tree indicates its connection with Cydon, a city of Crete, but it is thought not to have been indigenous to that country. At the present day it occurs spontaneously in the south of France and on the banks of the Danube.—The quince is mentioned by Columella and by Pliny, who gives directions how it can be kept for winter use. It was in much esteem and veneration among the ancients, and was regarded as an emblem of love and happiness. Many myths are connected with it, and from the rabbinical writings it is even thought to have been the forbidden fruit. The earliest herbalists make mention of the quince tree as very common in the gardens of England. There are several varieties, but the most distinct are the pear-shaped, which is doubtless the typical form, the apple-shaped, and the Portugal. The first is the most abundant bearer, but its fruit is not so much esteemed as that of the second; this however is only a seedling variation, and its seeds when sown produce the pear-shaped quince as frequently as its own form. To reproduce it with certainty, recourse must be had to other means. The Portugal is not so good a bearer as the others, nor is the color of its fruit of so deep an orange. The orange quince is a local sub-variety, and so is the large-fruited quince of the fruit catalogues.—The quince tree is readily propagated by its seeds, which ripen as well as those of the apple, and can be sown in the same manner; layers produce fine plants, and even cuttings, put in the ground in autumn or early in the spring in some moist shady situation, root easily. The better sorts can be also budded, using the inferior kinds for stocks, or even the common thorn. The tree used as a standard needs little pruning, removing the lateral branches merely, or thinning the top to secure larger fruit. It delights in a rich mellow soil, and will repay the cost of annual top-dressing with manures. Care should be taken to examine the base of the trunk for the ravages of the borer (*saperda bivittata*, Say), which prove very destructive. A remarkable yellow fungus (*ceratitium Cydoniæ*) sometimes attacks the young fruit and causes a considerable loss. The quince tree is used for stocks for budding or engrafting the pear when needed for dwarfs; the best sorts of quince stock are the Portugal, which has a more vigorous and free growth, and a variety called the Angers. As a fruit the quince is chiefly used for preserving with sugar, and in making marmalades, jellies, &c. A wine is made of it in England. The mucilage which envelopes the seeds is useful in relieving sore throat.—The Chinese quince (*C. Sinensis*, Thouin) is a very handsome species, growing 20 feet high in an arborescent manner; its leaves are ovate, acuminated at both ends, acutely serrate and shining, smooth when full grown; the flowers rosy, becoming red; fruit egg-shaped, large, hard, almost juiceless, and of a greenish color. The Japan quince (*C. Japonica*, Pers.) is one of the most desirable shrubs in cultivation, and is conspicuous for its rich and abundant crimson blossoms in early spring. It was known in England about 60 years ago, and has found favor widely in America for nearly the same period. Its stem is low, straggling, and bushlike, throwing up numerous spiny suckers, which fit it for use in making live hedges; its leaves are oval, somewhat wedge-shaped, crenately serrated, smooth on both sides, stipules reniform and serrated; flowers mostly 2 or 3 together, calyx smooth, the sepals short, obtuse, entire; corolla with 5 rich crimson petals; stamens in 2 rows; fruit small, hard, austere, with a singular aromatic and peppery perfume, and of a greenish yellow color. The Japan quince trained to a wall or upon a framework produces a very fine effect, and when trained to a single stem its drooping branches are very picturesque. It is propagated from pieces of its roots, from suckers and layers, or from cuttings. A very distinct variety with creamy and blush-tinted flowers, and another with semi-double red flowers, are known to gardeners. Other superior varieties are the results of the labors of floriculturists.

QUINCY. I. A township of Norfolk co., Mass., 8 m. S. by E. from Boston, bordering on Quincy bay, and on the line of the Old Colony and Fall River railroad; pop. in 1860, 6,788. About 3 m. from the bay, in an elevated range, are immense quarries of granite, employing over 800 men, and yielding to the annual value of about $250,000. The village is beautifully situated on a plain in the centre of the township. It contains a town house, a newspaper office, 2 banks, and 8 churches, viz.: 2 Congregational, 1 Episcopal, 2 Methodist, 2 Roman Catholic, and 1 Universalist. It was formerly called Braintree, and is noted as the birthplace of John Hancock, John Adams, John Quincy Adams, and Josiah Quincy, jr. In 1828 a stone church was erected, containing monuments to the memory of John Adams and his wife, and John Quincy Adams and his wife. A horse railroad is in process of construction connecting Quincy with Boston. II. The capital of Adams co., Ill., on the Mississippi river, 160 m. from St. Louis, 110 m. W. from Springfield, and 268 m. S. W. from Chicago; pop. in 1860, 13,718. It is handsomely situated on an elevated bluff commanding an extensive view of the river and country around, and has an active trade. It contains the court house, a number of manufacturing establishments, 3 banks, 5 newspaper offices, and 21 churches. It has very extensive railroad communications, being the W. terminus of the Chicago, Burlington, and Quincy, and the Quincy and Toledo railroads, and is also connected with St. Joseph, on the Missouri, by a railroad to Palmyra.

QUINCY. I. JOSIAH, jr. (so known to his contemporaries to distinguish him from his father of the same name, who survived him), an American lawyer, orator, and political writer of the period just preceding the revolution, born in Boston, Feb. 23, 1744, died at sea off Gloucester, Mass., April 26, 1775. He was graduated at Harvard college in 1763, and studied law with Oxenbridge Thacher, jr., a barrister in large practice, whom on his death in 1765 he succeeded in his business and took at once the highest rank in his profession. After the passage of the stamp act, notwithstanding the military occupation of Boston by the British, he fearlessly denounced the oppressions of the parliament and its violations of the rights of the colonists, in public meetings and through the press. Though of a slender frame and imperfect health, he had a voice of great compass and beauty, a graceful and passionate delivery, and a flow of thought at once fervid and logical, which placed him in the first rank of the orators of that day. His name was always joined by his contemporaries, and still continues to be so, with those of James Otis and Joseph Warren, as men who were most powerfully influential in causing the revolution, though death or calamity hindered them from assisting in its progress and its triumph. Beside his speeches in town meetings and other public assemblies, in Faneuil hall and the Old South church, he inflamed and directed the public sentiment of that critical time by his bold and animated appeals through the newspapers of the day, under various signatures, but with no real concealment of authorship. In May, 1774, he published his principal political work, "Observations on the Boston Port Bill, with Thoughts on Civil Government and Standing Armies." This was published with his own name on the title page, and produced a strong and permanent influence on the opinions and purposes of the period. In it, as in his anonymous writings, he distinctly states the inevitable necessity of the appeal to arms which soon followed, but which few were then ready to regard as unavoidable, and plainly shadows forth independence as the necessary result, which still fewer were then ready to contemplate. This work was republished in London, and excited much attention on the part both of ministerialists and the opposition. It bears marks of having been written in feverish haste at moments snatched from professional avocations. He had not even time to correct the proofs, which service was performed for him by Samuel Adams. An attempt was made to deter him from publishing this work by an elaborate and well written letter sent to him anonymously, but believed to have proceeded from a high functionary of the government. To this letter he made a brief but spirited reply through the "Massachusetts Gazette," and forthwith proceeded with the publication. Previously to this, however, after the "Boston massacre" of March 5, 1770, he gave the strongest proof possible of his moral courage and sense of professional duty. Immediately upon the arrest of Capt. Preston and the soldiers who fired upon the people, application was made on their behalf to Mr. Quincy and to John Adams to act as their counsel. This duty they accepted in the face of the strongest popular opprobrium, and in the case of the former of an impassioned remonstrance from his father. They were not deterred from their duty, however, and on the trials the next autumn the acquittal of the prisoners justified their course, and did honor to the sense of justice and self-control of the eople of Boston. In 1773 the severity of his rofessional labors and the political excitements f the time told so powerfully on Mr. Quin y's health, that he was obliged to remove imself from both for a time. He accordingly ailed for Charleston, S. C., and paid a visit of few weeks to that city, returning on horse ack in the spring. During this tour he put imself in communication with the principal higs of the southern and middle states, and tablished a plan of correspondence between hem and the Massachusetts patriots which was f material service in organizing the revolu ion. The health of Mr. Quincy again yield ng to his severe application to affairs, he was revailed upon in Sept. 1774, by the urgency f political as well as personal friends, to pro eed to England on a private mission for the opular cause, as well as for the good of his ealth. This visit, occurring at so critical a oment, excited considerable notice in London. e had interviews, at their own request, with ord North and Lord Dartmouth, and was in onstant intercourse with Dr. Franklin, Col. artley, Gov. Pownall, the earl of Shelburne, ol. Barré, Dr. Priestley, Dr. Price, and other minent friends of America. Lord Hills orough denounced him with Dr. Franklin, in is place in the house of lords, as a man who, the government did its duty, "would be in ewgate or at Tyburn." The results of his ission he and the English whigs regarded as f the utmost importance to the American ause; but they were of a nature that could ot be committed to writing with safety to the arties concerned. He accordingly prepared o return early in the spring of 1775, against he advice of Dr. Fothergill, postponing his hances of recovery to the discharge of a pub c duty. Unfortunately, however, he grew orse and died just before arriving. Almost is last words were that he should die content ould he have but an hour's interview with amuel Adams or Joseph Warren. The revo ution had been begun at Lexington, but he had ot the consolation of knowing it. His death aused a general grief throughout the country, s his labors in exciting the revolution were niversally acknowledged, and the loss of the ervices he was expected to render in its prosecu ion, had he survived, was universally lamented.

I. JOSIAH, an American statesman, son of he preceding, born in Boston, Feb. 4, 1772. e received his early education at Phillips cademy, Andover, Mass., and was graduated Harvard college in 1790. He studied law ith Judge William Tudor of Boston, but the ractice of the profession had fewer attractions r him than the stirring politics of that day, hen the people of the country had just begun organize themselves into parties, under the erce excitement of the French revolution. e joined the federalists at the birth of the arty, and remained constant in his allegiance it to the last. He was early selected as one ted by hereditary dispositions as well as by the turn of his talents and studies for public life. He was a candidate for congress in 1799, but was defeated in that year and twice afterward by the democratic candidate. In 1805 he was elected and served until 1813. During the whole term of his parliamentary life the federal party was in a hopeless minority. Its only service was one of protest, and Mr. Quincy was its most prominent and efficient member in the discharge of this duty. With great readiness in debate, earnestness and fervor of speech, quickness of wit, keenness of satire, and the most thorough personal intrepidity, he was a constant thorn in the side of the administrations of Jefferson and Madison. The embargo, the war of 1812, the erection of the Orleans territory into a state, which were the chief public measures of that period, he encountered with the most untiring hostility. He was one of the first, if not the first, among northern men to denounce the slaveholding interest as a rising and dangerous tyranny. In 1813 he declined a reelection, and returned to private life, dividing his year between Boston and his country seat at Quincy, where he applied himself with energy to scientific farming. He was immediately elected a member of the state senate, where his opposition to the war was as earnest as in congress, and quite as annoying to the administration, inasmuch as the federalists had a large majority in both houses. He joined in the protest of the legislature against the war and the admission of Louisiana, and reported the famous resolution, occasioned by a proposed vote of thanks to Capt. Lawrence for the capture of the Peacock, to the effect that in a war waged without justifiable cause and for conquest and ambition, it was not becoming a moral and religious people to express approbation of exploits not immediately connected with the defence of the seacoast and harbor. He remained in the state senate until 1821, when he was dropped by the federal managers under an impression that his uncompromising course had weakened his popularity. His immediate election to the house of representatives at the head of the ticket showed that they misunderstood the people, and he was elected speaker, which office he held while in the house. In 1822, however, he resigned to take the office of judge of the municipal court of Boston. During his short term of judicial office he first laid down the law in the case of Joseph T. Buckingham, indicted for a libel on John N. Maffitt, that the publication of the truth, with a good intention and for a justifiable end, is not libellous. This ruling excited great discussion and no small censure at the time, but is now the acknowledged rule of law in this country and in England. The next year, 1823, he left the bench to become the mayor of Boston, being the second incumbent of that office. In its administration he conducted himself with preëminent decision, energy, and capacity, and left to municipal magistrates everywhere an excellent example of industry, disinterestedness, and fidelity. In 1828 he lost his election through the influence of the fire department, which he had reorganized, in consequence of his refusal to appoint a person he deemed incompetent as the chief engineer. The presidency of Harvard university was then vacant through the resignation of Dr. Kirkland, and the corporation at once and unanimously offered it to him. There was some objection on the part of the clergy to the appointment of a layman to a post which had almost always been filled by one of their order; but the voice of the general public approved the selection, and the result justified it. He was inaugurated in June, 1829, and held the post until Aug. 1845, when he resigned, followed by the regrets of all the members and friends of the college. A man of the world and of business, as well as a lover of letters, he conducted the affairs of the college and administered its discipline in a manner which left it in a state of high prosperity. Since then he has lived a strictly private life, except in the year 1856, when he took a prominent and influential part, by speech and through the press, being then in his 85th year, in the effort to elect Col. Fremont to the presidency. He is still living (1861) in full possession of all his mental faculties and the thorough enjoyment of life, the patriarch of the public men of America. Beside many speeches in congress and orations on particular occasions, the chief of which are those on July 4, 1826, the jubilee of independence, on the second centennial celebration of the settlement of Boston, Sept. 1830, and the second centennial of Harvard university, Sept. 1836, Mr. Quincy has published the works named below: "Memoir of Josiah Quincy, Jr., of Massachusetts" (Boston, 1825); "History of Harvard University" (2 vols., Cambridge, 1840); "The Journals of Major Samuel Shaw, the first American Consul at Canton, with a Life of the Author" (Boston, 1847); "The History of the Boston Athenæum" (Cambridge, 1851); "The Municipal History of the Town and City of Boston during two Centuries" (Boston, 1852); "The Life of John Quincy Adams" (Boston, 1858); "Essays on the Soiling of Cattle" (Boston, 1859). III. **Edmund**, a political and miscellaneous author, son of the preceding, born in Boston, Feb. 1, 1808. He was graduated at Harvard college in 1827. He has published "Wensley, a Story without a Moral" (Boston, 1854), and has been a frequent contributor to literary periodicals and political newspapers. He has long been prominent among the Garrisonian abolitionists.

QUINCY, Quatremère de. See **Quatremère de Quincy.**

QUINET, Edgar, a French historian, poet, and philosopher, born at Bourg-en-Bresse, department of Ain, in 1803. Having visited Germany and acquainted himself with German philosophy, he published a translation of Herder's *Ideés sur la philosophie de l'histoire de l'humanité* (3 vols. 8vo., 1827), with an introduction, and in 1828 accompanied a s tific commission to the Morea, where h lected material for his *Grèce moderne et* *ports avec l'antiquité* (8vo., 1830). Becn contributor to the *Revue des deux mon* published in it in 1831–'2 a number of p beside an ambitious poem entitled *Aha* which was reprinted in book form in He also contributed to the same periodi *poëtes de l'Allemagne* (1834); *La poésie* *Homère*, *L'épopée Latine* (1836), and *L'* *Française* (1837), and published *Voyag* *solitaire* (1836), and two poems: *Na* (1836), and *Prométhée* (1838), in which tempted to realize what he conceived the "democratic epopee." The mythical and philosophical pretensions of these p being little in accordance with French they had but moderate success. He con his studies on epic poetry in a brilliant *Sur l'épopée Indienne*, and, under the tit *Allemagne et Italie*, published a collecti philosophical and poetical compositions 8vo., 1839). Although appointed in 18 fessor of foreign literature at Lyons, he wr 1840 a sharp pamphlet against the policy government and the war in the East, und title of 1815 *et* 1840, which was followed *Avertissement au pays* in 1841. This di prevent his appointment in 1842 to the p sorship of the literature of southern Eu just established at the college of France. now produced *Le génie des religions*, and Michelet began a vigorous crusade ag the Jesuits, whom they both assailed u ingly in their public lectures. *Les Jé* summary of these lectures, which they p lished in conjunction in 1843, had an imm sale; and Quinet's own pamphlets, *De la l* *de discussion en matière religieuse*, *Répo* *quelques observations de Mgr. l'archevêq* *Paris* (1843), *L'ultramontanisme, ou la s* *moderne et l'église moderne*, and *L'inquis* *et les sociétés secrètes en Espagne* (1844), w scarcely less successful. But the war had be pushed too far for the government to overl it, and Quinet was suspended from his pro sorship. He occupied his leisure in visi Spain, and printed on his return *Mes vac* *en Espagne*, and *Le Christianisme et la ré* *tion Française* (1846). The next year, bei elected a deputy by his native town, he p ticipated in the reform manifestations, t up arms in Feb. 1848, and triumphantly re sumed his professorship at the college of Fran where he was proud "to inaugurate the re public in the very chair of a king's lecturer." He was elected colonel of the 11th legion of the national guard of Paris, and sent by his department to the constituent and legislative assemblies, where he took his seat among the ultra radicals. In the mean time he published his *Révolutions d'Italie* (1848), and on the French expedition to Rome issued a pamphlet, *Croi* *Autrichienne, Française, Napolitaine et Espagnole contre la république Romaine.* This was followed by *L'état de siége* (1849), *L'enseignement du peuple* (1850), and *Révision* (1851). By the decree of Jan. 9, 1852, he was exiled from France, and retired to Brussels, where he married the daughter of Asaki the Moldavian poet. His dramatic poem, *Les esclaves*, appeared in 1853, and a historical essay, *Fondation de la république des États Unis*, in 1854. In 1855 he published a remarkable article in the *Revue des deux mondes*, entitled *Philosophie de l'histoire de France*. He has since prepared an edition of his *Œuvres complètes* in 10 vols. 8vo. and 12mo., and to these in 1860 he added the last of his philosophico-poetical performances, *Merlin l'enchanteur* (2 vols. 8vo.).

QUINIC ACID. See Kinic Acid.

QUININE, or Quinia, an alkaline substance discovered by Pelletier in 1820, and procured from that variety of the yellow bark of the cinchona tree known as *calisaya*. This bark is the product of the *cinchona calisaya*, and is exclusively obtained from Bolivia and the S. part of the adjoining Peruvian province of Carabaya. This yellow bark has been commonly referred to the *cinchona cordifolia*, but it is ascertained that this species of the tree, which is common in New Granada, is unknown in the region where the true quinine bark is obtained. Several other species afford some quinine, but the other alkaloid, cinchonia, being more abundant in their bark, they are less valuable than the *C. calisaya*. The forests in which this tree is found are in the Bolivian provinces, Enquisivi, Yungas, Larecaja, and Caupolican, at distances of 8 or 10 days' journey from inhabited places. They are visited by parties of Cascarilleros, men devoted to this business, who make an encampment and roam through the region around, cutting down the trees they find and gathering the bark. That of the branches, being laid in the sun, rolls up and forms the quilled variety; the larger pieces from the trunk are piled up together and pressed flat by weights. When dry they are carried into the camp, where they are assorted for transportation. La Paz is the principal town in the interior where the bark is collected. It is thence sent to Arica on the coast, and from this and other ports is largely exported to Europe and the United States.—The manufacture of quinine is extensively carried on in Paris, in Stratford, England, and in Frankfort, from which place Russia, Prussia, and Austria are chiefly supplied with this medicine. In Philadelphia the business of extracting it from the bark is conducted in chemical establishments also upon a very large scale. The quinine in the process of its extraction is commonly converted into the sulphate, which is the salt chiefly employed in medicine, and of which from 2.5 to 3 per cent. is usually obtained from the yellow bark. The processes employed vary somewhat in different countries. From a strong decoction of the bark in water, acidulated with hydrochloric acid and filtered, the quinine may be set free from its combination with kinic acid and precipitated by addition of lime water; some lime combined with coloring matter falls with it. The precipitates are well washed with water, and the residuum is pressed, dried, and pulverized. It is then repeatedly treated with alcohol, which dissolves the quinine and leaves most of the impurities. These being separated, the solution is concentrated by evaporation to a brown viscid mass, which is impure quinia; or the tincture in the distilling vessel may be neutralized with sulphuric acid, and the alcohol being then distilled off, an impure sulphate is obtained which crystallizes on cooling. This is expressed, and then dissolved in boiling water to which purified animal charcoal has been added. It is filtered while hot, and then allowed to cool and crystallize. The purification is completed by again dissolving and crystallizing. Sulphate of cinchonia is commonly present, but being more soluble does not crystallize so readily as the sulphate of quinia, and remains in the mother liquor. This also contains what Liebig regards as an amorphous variety of quinine, which is analogous in its properties to uncrystallizable sugar; it is known as quinoidine, and possesses the same medical properties as the sulphate. Sulphate of quinine, or more properly the disulphate, is the medicine commonly known as quinine. It consists of one equivalent of sulphuric acid 40, two of quinine 324, and 8 of water 72=436. It is in fine, white, silky crystals, which on exposure to the air effloresce and lose their form together with their water of crystallization. It dissolves in 30 parts of boiling water, but separates on cooling. In ether it is slightly soluble. Alcohol when cold takes up one part in 60, and the diluted acids, tartaric and oxalic, dissolve it freely. In water acidulated with sulphuric or other acid it readily dissolves, and this property is taken advantage of in administering the medicine in a liquid form.—The effects of sulphate of quinine upon the system are similar to those of Peruvian bark, and it is now in general use as a substitute for this drug, being not only more easily administered in large doses, and better retained by the stomach, but also acting when required through the pores of the skin. It is a very powerful tonic and the most valuable remedy in intermittent and remittent fevers. It is exhibited in pills and also in solution, and it is found that its extremely bitter taste may be neutralized without affecting its medicinal efficacy by the addition of ¼ of its weight of tannic acid. In malignant intermittents it has also been applied externally in the form of an ointment. Quinine in large doses powerfully affects the brain, and even as ordinarily administered its effects are soon manifest in a feeling of tightness or distention of the head, ringing or buzzing sounds, and dulness of hearing. Deafness is often induced, which however passes off; but in very large doses the most serious effects have followed its use.—Quinine is often adulterated, chiefly with gypsum and other alkaline or earthy salts, also with sugar, gum, starch, stearine, caffeine, and various other substances. Any mineral substance not volatizable is detected by exposing the quinine to a red heat, by which the pure salt is entirely dissipated. Treatment with alcohol and other solvents exposes those impurities which are not also soluble in them.

QUINSY (*tonsillitis*, *amygdalitis*, or *cynanche tonsillaris*; Fr. *esquinancie*), common inflammatory sore throat. Though called tonsillitis, the inflammation is rarely confined to the tonsils themselves, but involves the pharynx, the soft palate, and the uvula, and sometimes extends to the root of the tongue. It commences with a feeling of dryness and discomfort about the throat, and with pain in swallowing. On examination the mucous membrane lining the throat is found to be reddened and the tonsils more or less swollen. As the disease advances, the inflamed parts, at first preternaturally dry, become covered with visoid mucus, and the distress of the patient is greatly enhanced by the efforts which he is tempted to make to remove this secretion. In many cases suppuration occurs in one or both tonsils; when this takes place those organs are often enormously swollen, and together with the swollen and inflamed palate may render the breathing difficult and painful. In such cases the febrile reaction is strongly marked, the skin being hot and the pulse full and frequent; the patient is entirely unable to take nourishment, and the voice becomes thick and characteristic of the disease. The pain, exceedingly acute when the patient attempts to swallow, or to clear his throat of the viscid mucus which adheres to it, often extends to the ear, and sometimes is attended with partial deafness. The bursting of the little abscess formed in the tonsil is at once followed by great relief to the patient; the matter has a nauseous taste and often an exceedingly offensive smell. The disease, though very painful, is attended with little or no danger; it must be remembered, however, that the inflammation may by extension involve the larynx and thus prove fatal, and cases are on record in which death has occurred from the ulceration having involved a branch of the carotid artery.—The disease requires but little treatment. A mild purgative in the commencement and the use of warm water as a gargle are all that are necessary. Early in the attack powdered guaiac resin in doses of 20 or 30 grains, suspended in mucilage or sirup, several times a day, often gives great relief and seems to cut short the attack. Late in the disease stimulant and astringent gargles may be advisable.

QUINTANA, Manuel José, a Spanish poet and patriot, born in Madrid in 1772, died there, March 11, 1857. He was educated at Salamanca for the profession of the law, which he practised for a time at Madrid. His tragedy of "The Duke of Viseo," imitated from "The Castle Spectre" of M. G. Lewis, was performed in 1801, and was not successful. In 1802 he produced a small volume of lyric poems patriotic spirit immediately brought th favor, and in 1805 placed upon the s *Pelayo*, intended to rouse his countrym resist foreign oppression, which was well received. His "Lives of Disting Spaniards" (1807), and 3 volumes of se from Spanish poets, with critical notes prepared with the same patriotic motive the revolution of 1808 he published his to Emancipated Spain," and, both thro press and as secretary to the cortes regency, exerted himself to the utmost half of his country; but after the retu Ferdinand VII. from France in 1814, Q was confined for 6 years in the fortress peluna. After the revolution of 1823 mained in Estremadura until the acces Isabella II., whose education he had s tended, when he was recalled to office, a peer, and crowned with laurel. His plete works have been published in neyra's *Biblioteca de autores Españoles* (

QUINTILIAN (Quintilianus), Marc bius, a Roman rhetorician, born prob Calagurris in Spain about A. D. 40, died 118. He was educated at Rome, study der Domitius Afer, and after revisiting tive country returned with Galba, and the profession of an advocate, and al came distinguished as a teacher of ele Among his pupils were the younger Pliny the two grand-nephews of Domitian, by monarch he was invested with the co honors and title. He was the first wi ceived from the imperial treasury a re salary of 100,000 sesterces a year, whi given him by Vespasian. For 20 years taught oratory with such success, that his became synonymous with excellence in th His great work was a treatise on the edu of an orator, entitled *De Institutione Or Libri XII.* There are 164 declamations as to him; and he wrote also a work *De C Corruptæ Eloquentiæ*. The first complete of the "Institutes" was discovered by P Bracciolini in the monastery of St. Gall w attending the council of Constance. The *tio princeps* was printed at Rome by Phi Lignamine (fol., 1470); the best edition is begun by Spalding and finished by Zump vols. 8vo., Leipsic, 1798–1829). The "Insti tutes" have been translated into English Guthrie (2 vols. 8vo., London, 1756), by Pa sall (2 vols. 8vo., 1774), and by Wats vols., London, 1856).

QUINTUS CURTIUS RUFUS. See Curti

QUINTUS ICILIUS. See Guischard.

QUIRINUS. See Romulus.

QUITCLAIM, a word often used in de and usually in connection with words of g and conveyance, when the grantor or selle tends to convey to the grantee or buyer al right, title, interest, and estate of the gra but without any warranty whatever, wh of title, quantity, or any thing else. Sometim deed purports to be a deed of "grant and itclaim," when the grantor adds to the words grant and conveyance, words of limited warranty; as, for instance, warranty against himlf and all persons claiming by, from, through, under him. Even this limited warranty, nd still more a general warranty, would estop he grantor from ousting the grantee by any etter title, not coming through the grantor, hich the grantor might acquire subsequently his deed. But if the deed were one of grant nd quitclaim only, without any warranty, the rantor might then assert such a title. For xample, A sells and conveys to B, by grant nd quitclaim only, for a full price, an estate which it turns out that A has no title. But subsequently acquires title to it by inheritance from the true owner. A may now get he estate from B; but not if he granted with arranty, because if he then took the estate his better title, B would turn round upon im on the warranty and get the estate back gain. Quitclaim is also used in receipts, usully with such words as release and discharge, hen it is intended to signify that the party iving the receipt or release agrees never to ake any claim against the other party for any xisting debt.

QUITMAN, John Anthony, an American olitician and soldier, born in Rhinebeck, utchess co., N. Y., Sept. 1, 1799, died in atchez, Miss., July 17, 1858. His father was native of Prussia, his mother of Curaçoa. In is 16th year he was employed as tutor at Hartwick academy, near Cooperstown; at 18 s professor of English literature at Mount Airy college, Germantown, Penn.; and at 19 e travelled on foot to Chillicothe, where he ntered a law office, supporting himself meanwhile by teaching. He subsequently accepted clerkship in the U. S. land office, Delaware, O., where he was licensed to practise law. In 821 he removed to Natchez, Miss., became a artner of Mr. William B. Griffith, a prominent lawyer, was elected member of the legislature in 1827, appointed chancellor of the state n 1828, and subsequently continued in that office by election, and was chosen a delegate to the convention for revising the state constitution. Resigning the chancellorship in 1834, he was elected to the state senate, and chosen its presiding officer. While performing this duty, a vacancy happening in the executive office, its functions devolved on him in 1836; but he soon after withdrew from political life, and raised a small body of men with whom he joined the Texans in their struggle for independence. He remained in the field until the capture of Santa Anna, when, considering the war at an end, he returned to Natchez and resumed the practice of his profession. At the same time he discharged the duties of majorgeneral in the militia, director of the state hospital and of the Natchez lyceum, trustee for the state university, and president of the board of trustees for Jefferson college, beside superintending several large sugar and cotton estates. In July, 1846, he was appointed brigadier-general in the U. S. army, and ordered to report to Gen. Taylor at Camargo. Quitman's brigade consisted of the 1st Mississippi and 1st Tennessee regiments. At the battle of Monterey, which soon followed, he distinguished himself by his successful assault on Fort Teneria, and his daring advance into the heart of the city, fighting from house to house, and driving the Mexicans from barricades and batteries. Soon after the capitulation of Monterey, at his own request, he was ordered to report to Major-Gen. Scott at Tampico. At the siege of Vera Cruz, he commanded in the first sharp engagement with the enemy, and subsequently led an expedition against Alvarado, in conjunction with the naval forces under Com. Perry. He rejoined the army soon after the battle of Cerro Gordo, and formed part of the advance under Gen. Worth that took possession of the city of Puebla. Here he was breveted majorgeneral for gallantry at Monterey, and received a sword voted him by congress. In the attack on Chapultepec his division formed one of the assaulting columns. He stormed the formidable works at the base of the hill, and promptly pushed forward to the Belen gate, which he carried by assault, and planted the colors of the South Carolina regiment, thus taking possession of the city of Mexico, in advance of the general-in-chief, who, with Worth's division, was approaching by the San Cosme road. During the night, in the face of a tremendous fire, he erected batteries to support an attack upon the citadel, a formidable work immediately in his front; but early in the morning it surrendered. When the general-in-chief arrived, he appointed Quitman governor of the city. He retained the office until he had thoroughly established order and discipline, and then solicited leave to return to the United States. He was soon after, and almost by acclamation, elected governor of Mississippi. While exercising the duties of this office, upon the finding of a federal grand jury in Louisiana, he was threatened with arrest for alleged complicity with Gen. Lopez in organizing an expedition to Cuba. Denying the right of the federal government to arrest the chief magistrate of a state, he urged a suspension of proceedings until the expiration of his term of office, pledging himself then to demand a trial; but this being refused, he resigned his office, not wishing to provoke a collision with the federal authorities. He went to New Orleans in the custody of the U. S. marshal, but after an abortive effort to obtain evidence, the prosecution was abandoned. The democratic party in Mississippi immediately renominated him for governor, and he entered upon the canvass, his opponent being Gen. H. S. Foote. The adjustment or compromise measures of 1850 constituted the issue, Quitman being strongly adverse to them. While this canvass was progressing, the people of Mississippi having, at an intermediate election for delegates to a state convention called to consider these measures, condemned the political views he was known to entertain, Quitman withdrew from the contest, and retired once more to private life. In 1855 he was elected to congress by a large majority, and in 1857 was reëlected without opposition. During his whole term he remained at the head of the military committee. He took an active part in the general business and debates, but his parliamentary fame rests chiefly on his celebrated speech for the repeal of the neutrality laws, and his argument on the powers of the federal government, which gave him a position as the recognized head of the state rights party. He had never ceased to contemplate armed intervention in behalf of the Cubans as a duty, and he sympathized with every movement for the extension of American institutions in the western hemisphere. His life has been written by J. F. H. Claiborne (2 vols. 12mo., New York, 1860).

QUITO, the capital of the republic of Ecuador, and of a district of its own name, formed by a valley in the Andes, situated in lat. 0° 13′ S. and long. 78° 43′ W., on the E. flank of the volcano of Pichincha, 10,233 feet above the sea, being one of the highest inhabited points of the globe; pop. 80,000. Although almost immediately under the equator, its elevation imparts a degree of mildness and salubrity to its climate rarely found under the tropics. Its temperature averages about 60° F., and may be truly described as that of eternal spring. Fenced round by distant mountains, and immediately surrounded by plains and fertile valleys, the city forms the centre of one of the finest landscapes of the globe. Skirting the horizon may be discerned 8 snowy peaks of the Andes; and to the N. and S. of the city are the broad and beautiful plains of Añaquito and Turubamba, the first celebrated as the scene of the great battle between Gonzalo Pizarro and the viceroy of Peru, Blanco Nuñez de Vela, in which the latter was defeated. Quito has a number of large and beautiful public squares, of which the most celebrated are those of San Francisco, Santo Domingo, and Plaza Mayor, the last surrounded by the cathedral and government buildings. Each square has a stone fountain in its centre, supplied by subterranean aqueducts. There are many fine churches, of which the most famous are that of the Jesuits, adorned with columns, statues, and rich sculptures, and those of San Francisco and La Merced. The principal other edifices are the palace of the government, that of the archbishop, and the house of the Jesuits, now dedicated to various uses; one portion being occupied by the university; another by the seminary of San Luis, in which there is a public library of 15,000 volumes and a museum; a third by the mint; and a fourth by the barracks and armory. Quito is the residence of the sole archbishop of the country, and has, beside the university and the seminary of San Luis, a national college, a number of other educational establishments, 2 hospitals, and asylums for the insane and blind. The manufactures include coarse cotton and woollen goods, lace, hosiery, confectionery, and jewelry. There is a large traffic in grain, indigo, iron, steel, precious metals, wine, brandy, and oil, with Central America and Peru; and European manufactures are extensively imported.—The history of Quito goes back to a remote antiquity. Of its primitive rulers, tradition preserves the names of a number who were called Quita. About A. D. 280 the city is said to have been captured by certain foreign invaders, who, under the name of Siris, maintained their dominion until the invasion of the inca Huayna Capac, who subdued the old kingdom, destroying the last of the Siris in the sanguinary battle of Hatuntuati. Huayna Capac, in order to consolidate the kingdom, married the daughter of the Siri, and added to the red tassel of the incas the emerald which was the insignia of the kings of Quito. At his death he divided his kingdom between his two sons, Atahuallpa and Huascar, leaving to the first the sceptre of Quito, and to the second that of Cuzco. War however ensued between the brothers, in which Atahuallpa obtained control of the whole empire. But his triumph was of short duration, and he lived to find himself the prisoner of the Spanish adventurer Pizarro. Taking advantage of the capture of his king, Rumiñagui, one of the inca generals, usurped regal authority in Quito, but fled to the mountains on the approach of Sebastian Benalcazar. Under the Spanish dominion Quito, erected into a presidency, first formed part of the viceroyalty of Peru; afterward it was attached to that of Santa Fé, and subsequently restored to that of Peru, to which it remained attached until the independence of the country, when it was aggregated with Venezuela and New Granada in the republic of Colombia. On the dissolution of that republic in 1831, it was organized, with the districts of Azuay and Guyaquil, in a new republic under the name of Ecuador.

QUITRENT, certain kinds of rent, called quitrents, according to Blackstone, because the tenant thereby went quit and free of all other services. But this is the case with most rents; and the word came to be used generally in England to designate a small or merely nominal rent reserved, when the tenant or hirer paid in gross for the lease a large sum, about equal to the value of the land. The word is not much used in the United States, and cannot be said to have now any precise and definite technical meaning.

QUORRA. See Niger.

R

the 18th letter and 14th consonant of the English alphabet. It is a lingual and a uid, or semi-vowel, being pronounced both fore and after most other consonants. It is und in all languages except the Chinese and e tongues of some of the North American dians. The Romans borrowed it from the reek *rho* (P, ρ), which is derived from the ebrew and Phœnician *resh.* It is one of the st which children learn to pronounce, and ose who have been engaged in teaching perons deaf from birth to articulate, find the eatest difficulty in conveying any idea of its und to their pupils. The most common ode of pronouncing it is by an expiration hile the tongue touches the roof of the mouth ith a tremulous motion, as in the word rhetric. The tremulous sound is more distinct the Spanish *rr*, which indeed is not readily arned by Englishmen or Americans. It is equently exaggerated by the Irish and softned down by the English, who are more easily istinguished by their peculiar pronunciation f this letter than by that of any other.—The omans often added an *r* to words which they orrowed from the Greek, as *νυος*, *nurus;* *μαξ*, *murex;* and on the other hand often ropped it from the nominative case of nouns nd retained it in the oblique cases, as *æs*, *æris;* *s*, *oris.* It was interchanged sometimes with the words *arena*, *laribus*, *pignora*, *Furii*, *alerii*, and *Papirii* having been anciently ritten *asena*, *lasibus*, *pignosa*, *Fusii*, *Valesii*, nd *Papisii.* The same change is observed n some modern languages, as Eng. *hare*, Ger. *ase;* Eng. *was*, Ger. *war.* It is most frequently interchanged however with *l.* The hinese, who cannot pronounce *r*, always use n its place; the Japanese do exactly the rerse. (See L.)—As a Roman numeral R detes 80, or with a dash over it ($\bar{R}$) 80,000. he Greek P with a dash over it stands for 00, and with a dash under it for 100,000. As n abbreviation, R signifies *Roma*, *Romanus;* . P., *res publica;* R. C., *Roma condita.*

RAAB (Hung. *Győr* or *Nagy Győr;* anc. *rrabona*), a city of Hungary, capital of the unty of the same name, situated in a marshy ain at the junction of the Rabnitz and Raab, ear the entrance of the latter into the Danube, m. S. E. from Presburg and 67 m. W. N. . from Buda; pop. 18,000. It is the seat f a Roman Catholic bishop, has a cathedral d several other churches, and a number of her institutions for education, and carries on very active trade. Tobacco and cutlery, inluding swords, are manufactured. The town as a place of importance in the time of the mans. It was generally kept in a state of defence by the Hungarian kings, but after the battle of Mohács was twice taken by the Turks. A battle was fought under its walls in 1809, in which the French defeated the forces of the Hungarian nobles. The former fortifications of the town were razed after the French war. In the war of 1848–'9 the place was again very conspicuous. The Hungarians were defeated before it by Haynau, June 28, 1849.

RABATT, a town of Morocco, in Fez, at the mouth of the river Boo-Regreb, immediately opposite Salé, in lat. 34° 5′ N., long. 6° 46′ W.; pop. 21,000. The houses are well built, and it has some manufactures and trade. The environs are fertile, and figs, grapes, oranges, and cotton are produced.

RABBI (Heb., my master, lord, or teacher), a title of honor bestowed on the doctors of the Jewish law since the 1st century B. C. The Hebrew or Aramaic words *rab*, *rabba*, *rabban* (master), *rabboni* (my master), and *rabbenu* (our master), have also been employed in the same sense. In modern usage the title rabbi or rabbin is frequently applied to the distinguished Talmudic writers in general, including the authors of the Mishna and Gemaras, and sometimes in a more limited sense to the Jewish theological writers of post-Talmudic times, especially of the later periods of the middle ages, whose common dialect, a mixture of Hebrew and Aramaic, is therefore called rabbinical. The modern religious heads of Jewish communities or congregations are also called rabbis or rabbins, in which sense alone the title is sometimes used by the persons thus distinguished themselves. *Rab* is also used by the Jews of eastern Europe and others in the sense of the English Mr. or German *Herr*, being attached, both in conversation and writing, to the name of every married Jew enjoying a good reputation.

RABBIT, the common name of several species of the hare family, especially the *lepus cuniculus* of Europe and the *L. sylvaticus* of North America; the family and generic characters have been given under HARE. The European rabbit or cony (*L. cuniculus*, Linn.), the *lapin* of the French, is about 16½ inches long, with the tail 3 inches additional, and the ears also 3 inches; the tarsus shorter than in the hare; the general color gray brown, white below, the back of the neck rufous; tail white below, blackish above, but pencilled with dirty white; ears not tipped with black; compared with that of the hare, the skull has the muzzle, interorbital space, and incisive openings narrower; the mammæ are 5 pairs, 2 pectoral and 3 ventral. In the wild state the rabbit inhabits Europe, except the more northern portions, and N. Africa; it is thought to be originally from Spain, but, being hardy, has been carried to most parts of the world; it is easily distinguished from the hare by its smaller size, grayish color, and short feet and ears; it also differs from the hares in its burrowing habits. Unable to escape from its enemies by speed, it seeks safety in deep holes dug in dry sandy places, living in society in what are called warrens, with an ample supply of food at hand, in places suitable for burrows, such as sandy heaths covered by a prickly furze. Remaining concealed by day, they come out at twilight in search of food, and often do considerable mischief by digging up the newly sprouted corn and gnawing the bark from young trees; these warrens are often of large extent, and a source of great profit from the flesh and skins of the animals, which are caught in snares and traps, dug or drowned out, and hunted by dogs and ferrets. They are very prolific, beginning to breed at the age of 6 months, having several litters in a year and 5 to 8 at a time; the period of gestation is about 3 weeks, but, as the uterus is double, there may be two distinct litters at an interval of a few days; the young are born blind and naked, in a nest lined with the mother's soft fur; they are said to live 8 or 9 years. They seem to have social laws, the same burrow being transmitted from parent to children, and enlarged as the family increases. Rabbits and hares appear to be natural enemies; they are not met with in the same localities, and when they meet with each other almost always engage in deadly combat; when brought up together they do not produce a fertile offspring *inter se*, and hybrids probably never occur between them in the natural state. It has been estimated that in 4 years a single pair of rabbits would, if unmolested, become the progenitors of more than 1,250,000; but to check this increase we have the persecution of man and of carnivorous beasts and birds; their ravages are more than counterbalanced by their flesh, which forms a nutritious and easily digested article of food, and by their skins, which are used in making hats and are dyed to imitate more expensive furs. The name rabbit or cony is erroneously applied in the translation of the Hebrew Scriptures to the *shafan*, a small pachyderm with burrowing habits, described under Hyrax. Rabbits are easily domesticated, and in this state vary greatly in colors, size, and character of fur; black, white, and gray are the prevailing colors; in the silver-gray variety the hairs are white and black; the Angora rabbit is noted for the length and softness of its white fur; in the lop-eared varieties the size is 3 or 4 times that of the wild animal, and the ears are more or less bent downward from the base. When tame they do not pair like those in a wild state, and lose more or less the instinct of burrowing; their flesh is also inferior in flavor, though more delicate and digestible; the tame males not unfrequently kill the young.—The American gray rabbit (*L. sylvaticus*, Bach.) is about 16½ inches to the root of the tail, and to the end of the outstretched legs, that to the end of the hairs 2¼ inches; fur and soles of the feet full and soft; on the back lowish brown, lined with black, grayer on sides; on the rump mixed ash, gray, and pure white below; upper surface of the tail like the back, below pure cottony white; posterior edge of ears whitish, edges of the dorsal fur toward the tip black, the rest ashy brown, lead-colored at the base. This is among the largest of the short-eared *leporidæ* of America, being largest in the west and smaller and coarsest-haired in the south; it is found throughout the United States, from the eastern parts of New Hampshire to Florida, and to the upper Missouri, being most abundant in sandy regions covered with pines. It frequents woods and thickets, concealing its form, in thick bushes, or in holes by or under stones by day, coming out at night to feed; it is fond of visiting clover and fields, vegetable gardens, and nurseries of trees, where it does much mischief. It does not dig burrows like the European rabbit, but comes rather in the class of hares; when pursued it runs with great swiftness and with doublings to its hole in a tree or rock; though it will breed in enclosed warrens, it does not become tame, and has not been domesticated. It is very prolific, or else it would be exterminated by its numerous enemies; it often runs into the hole of the woodchuck, skunk, fox, or weasel, in the last 3 cases often falling a victim to the carnivorous inhabitant of the burrow; it is hunted by dogs, shot from its form, and caught in snares and traps; its flesh is much esteemed. It somewhat resembles the European rabbit in its gray color, but it does not change its colors like the latter; it is smaller and more slender. The sage rabbit (*L. artemisia*, Bach.), from the west and plains of Mexico and Texas, cannot be satisfactorily distinguished from the last species. The jackass rabbit or Texan hare (*L. callotis*, Wagn.) is so named from its very long ears, measuring about 5 inches, though the animal is rather smaller than the European hare; it is yellowish gray above, waved irregularly with black; upper part of tail black, sides gray, and whitish below; nape sooty black; it is found in Mexico, Texas, and Oregon. The long and slender legs indicate rapid locomotion and a capacity for making long leaps; it is a solitary and not very common species, and has not been found in California.

RABELAIS, François, a French author, born in Chinon, Touraine, in 1483, or perhaps a little earlier, died in 1553. The son of an apothecary or an innkeeper, apparently in good circumstances, he was sent at the age of 10 to the convent of Seuillé to be educated, but proved an idle pupil. At the monastery of La Baumette, where he was next placed, he showed equal distaste for study; but here he grew acquainted with the brothers Du Bel- the younger of whom was a fast friend protector to him in after life. How it pened that such a graceless young vagabond ered the order of Franciscans is not clear, probably it was in obedience to his father. mitted as a novice at Fontenay-le-Comte, he sed through the usual studies and ordeals, ordained priest in 1511, and made up for past laziness by devoting himself to the dy of ancient and modern languages, mas- ing the Latin, Greek, Italian, Spanish, Ger- n, English, Hebrew, and Arabic. Greek d especial attraction for him; and this in- lved him in serious quarrels with his fellow nks, who cherished such animosity toward t language that in 1520 the cells of Rabelais d his friend Ami were ransacked, and their cious Greek volumes confiscated. The ill ling grew so strong that the removal of the llenist became a necessity, and in 1524 he tained permission from Pope Clement VII. enter the order of Benedictines. He spent eral years at their house at Maillezais, but s no better satisfied than before, and in 30 abandoned the monastic life altogether, d repaired to Montpellier, the seat of the st celebrated medical school in France. re he attended lectures, and in 1530 was aduated as a bachelor in medicine and in 1537 a doctor. In 1532 we find him a hospital ysician at Lyons, and engaged in publishing notated and corrected editions of various med- l works of Hippocrates, Galen, and others. om 1533 to 1550 he published several editions a facetious production, in which he endeav- ed to destroy the faith in astrology which ll prevailed among the people. At Lyons o he published the first rough sketch of the range work upon which his fame rests: *Les its et dicts du géant Gargantua et de son fils ntagruel* (1533). Jean Du Bellay, his old hoolmate, now bishop of Paris, being on his y to Rome, where he had been appointed ench ambassador, took him in the capacity his physician, and thus enabled him to grat- y a long-felt desire of visiting Italy. In 534 he went back to Lyons for a short time superintend the printing of his edition of arliani's *Antiquitatis Romæ Antiquæ*. On s return to Rome he found that his patron d been promoted to a cardinalship; and rough his influence, aided by that of several her high dignitaries of the church, he suc- eded in obtaining from Pope Paul III. a bull, ted Jan. 17, 1536, which released him from e penalties he had incurred by the abandon- ent of his order. This instrument, which, ntrary to usage, was delivered to him gratis, lowed him "to return into any house of the Benedictine order which would receive him, d to practise physic on condition of doing so ithout hope of fee or reward." He now re- rned home and entered the abbey of St. Maur les Fossés at Paris, which was under the con- trol of Cardinal Du Bellay, and remained there in comparative ease and tranquillity until 1549, when he was presented by his protector with the comfortable living of Meudon. Here he applied himself faithfully to the duties of his ministry, and devoted his leisure hours to the completion of his great work, 3 books of which had already appeared. This being done in 1551, he once more repaired to Paris, published his 4th book, and spent his later years in devotional exercises at Meudon.—Such are the ascertained facts of a life which has been embellished by the most egregious fictions, originating generally in the idea that Rabelais was of necessity much like some of the characters he has depicted. He has been represented as a jolly buffoon, dreaming of nothing but good cheer and an easy life. There is not a particle of proof to substantiate this notion, while his profound and varied knowledge, the scientific works which he published, and his scholarly habits, are sufficient evidence of their falseness. The fanciful image of Rabelais that has lately been current must be set aside, and the writer must not be mistaken for one of his own heroes. No performance in French literature had greater success in its time, or has since attracted so much attention, as his "Gargantua and Pantagruel." It cannot be classed with any recognized order of works. It is a merciless attack upon monks, princes, kings, and all religious and political authorities. Amid its chaos of eccentricities and allusions to persons and events, of good sense and folly, of delicate thoughts and gross obscenities, commentators have tried in vain to find a historical explanation of the work. According to the most approved key, Gargantua stands for King Francis I.; Grandgousier for Louis XII.; Pantagruel for Henry II.; Picrochole for Maximilian Sforza, duke of Milan; Gargamelle for Anne of Brittany, the queen of Louis XII.; Badebec for Claude of France, queen of Francis I.; Grandgousier's... Grandejument de Gargantua for Diana of Poitiers; Panurge for the cardinal of Lorraine; and Frère Jean des Entommeures for Cardinal Du Bellay. Be this as it may, "the work was entirely in accordance with the taste of his age," as Vinet properly remarks; "and excellent minds which could appreciate its fine parts were also delighted with those that are repulsive to our taste." Lord Bacon styled Rabelais "the great jester of France;" while more recent judges have called him a "comic Homer." More than 60 editions of his great work have been published; the first complete one, containing the 5 books, appeared at Lyons in 1558. Among the subsequent editions, we may mention the two printed at Amsterdam in 1711 and 1741, with annotations by Le Duchat and La Monnoye (3 vols. 4to.); the standard modern *variorum* edition by Esmangart de Bournonville and Éloi Johanneau (9 vols. 8vo., Paris, 1823-'6); those of De l'Aulnay (3 vols. 8vo., 1835), of P. Lacroix (Bibliophile Jacob, 12mo., 1842, several times reprinted), and of Burgaud Des Marets and Rathery (2 vols.

12mo., Paris, 1857), the most convenient and acceptable of all, with a good biographical and critical notice, explanations, notes, &c. There are several English translations. That of Sir T. Urquhart, first published in 1653 (reprinted by the Maitland club, 4to., 1838), was adopted by both Ozell and Motteux as a basis. Their united translation is often reprinted; the last edition is by Bohn (2 vols., London, 1850). Sixteen private letters of Rabelais written while travelling in Italy were published in 1651.

RABUN, a co. at the N. E. extremity of Ga., separated from South Carolina on the S. E. by the Chattooga river, bordered N. by North Carolina, and drained by several small streams; area, about 350 sq. m.; pop. in 1860, 3,271, of whom 206 were slaves. It has an elevated surface, the Blue ridge extending along its S. E. border, and a considerable portion is covered with forests. The productions in 1850 were 64,699 bushels of Indian corn, 9,771 of oats, and 9,868 of sweet potatoes. There were 18 churches, and 644 pupils attending public schools. Capital, Clayton.

RACCOON (*procyon*, Storr), a genus of American plantigrade mammals of the bear family, of the section *subursinæ*. In this genus the size is comparatively small, the body stout, and the tail moderately long, bushy, and not prehensile; the muzzle is pointed, and the end very movable and slightly projecting; the teeth are: incisors $\frac{3-3}{3-3}$, canines $\frac{1-1}{1-1}$, premolars $\frac{4-4}{4-4}$, and molars $\frac{2-2}{2-2}$, in all 40, or with one upper true molar on each side less than in the bears. The shape is not unlike that of the badger, though the legs are longer; ears moderate, erect, and covered with hair; head broad behind and flat, with naked and large muffle; whiskers in 4 principal horizontal series, 5 or 6 bristles in each; feet 5-toed, with naked soles and no indication of webs; claws curved, not retractile, and sharp; though plantigrade when standing, the gait is rather digitigrade. The common raccoon (*P. lotor*, Storr) is 22 or 28 inches long, with the tail about a foot additional; the general color is grayish white, the tips of the long hairs black and giving this tint to the back; under surface dark brown; an oblique black patch on the cheeks, continuous with a paler one beneath the jaw, and another behind the ears; the end of muzzle, ears, and posterior part of cheek patch whitish; tail bushy, with the tips and 5 rings black, and the nearly equal interspaces rusty white; hind feet 4 inches long, dirty white above, the fore feet 2¾ inches; mammæ 6, ventral; there are anal glands which secrete a somewhat offensive fluid. Some varieties occur nearly black, others are nearly white. The raccoon is found generally over the United States, as far north as lat. 60° in the interior, as high as Newfoundland on the Atlantic, and further north on the Pacific; it is most abundant in the southern states, frequenting retired swamps covered with high trees and well watered. It is an excellent climber, in this way obtaining eggs and young birds; watching the soft-shelled turtle lay eggs in the sand, it uncovers and devours them; it seizes ducks as they come to the water; it is extremely fond of ripe and juicy corn, as well as of frogs and shell fish. It is not entirely nocturnal, and sometimes visits the fields and the poultry yard at midday; it feeds much on an inferior oyster in the southern states, hence called the raccoon oyster; in short the animal is truly omnivorous, eating, besides the above, rabbits, squirrels, and other mammals, fish, nuts, and honey. It has been generally supposed to dip its food in water before eating it, hence its specific name of *lotor* or washer; this it does not generally do in captivity, according to Bachman, and it is probably only an occasional habit of the animal. It hibernates during the coldest weather in the northern states; it is shy, and has an acute sense of smell; it brings forth about the month of May 4 to 6 at a time, in a nest in a hollow tree, about the size of half-grown rats, which utter a plaintive infant-like cry. It is a favorite sport of the southern negroes in winter to hunt "coons," driving them to a tree, and then climbing up and shaking them off, or felling the tree to bring them within reach of the dogs; they sell the skin to the hatters, and eat the flesh, which is generally very fat and tender, with a flavor of pig. Many are caught also in log and other traps, and are hunted by torchlight. In captivity it makes a very curious and interesting pet, being easily tamed so as to follow its master even into the crowded streets, ambling along in the manner of a bear, and picking his pockets adroitly of dainties.—The black-footed raccoon (*P. Hernandezii*, Wagl.), from Oregon, California, Mexico, and Texas, is somewhat larger, with the upper surface of the hind feet dark brown. The crab-eating raccoon (*P. cancrivorus*, Illig.), from Brazil and the northern parts of South America, is longer and more slender than the common species, grayish above shaded with brown and black, and yellowish below; the face is whitish, with a black band surrounding each eye; tail less distinctly annulated. Its habits are nearly the same as in the other species, but it is more arboreal; it is equally omnivorous, obtaining frogs, reptiles, and crustaceans when practicable; its flesh is also used as food. It is found on the sea coast and in the interior, and as far south as Paraguay; it has received its common name from one of its favorite articles of food.

RACHEL (Elisa Rachel Félix), a French actress, of Jewish parentage, born in Mumpf, Switzerland, Feb. 28, 1820, died at Cannet, near Toulon, Jan. 3, 1858. Her father, a peddler, pursued his calling in various parts of Switzerland and Germany, and was followed in his wanderings by his family, consisting of his wife, 4 daughters, of whom Rachel was the second, and a son. At Lyons, where they took up their residence temporarily, Rachel and her elder sister Sarah contributed to the common support by singing at the cafés and other pub-y resorts; and at Paris, whither the family moved in 1831, the two sisters similarly employed themselves on the boulevards. Choron, he founder of the royal institution for the udy of sacred music, struck by their performances, took them both under his instruction; ut finding that the talent of Rachel, to whom e gave the name of Elisa, was dramatic rather han vocal, he transferred her to the care of M. t. Aulaire, a teacher of declamation, who carefully grounded her in the chief female parts of he standard classical drama. Her admirable ersonation of Hermione at a private performance of *Andromaque* procured her admission in 1836 as a pupil of the *conservatoire*; and hortly after she obtained an engagement at the ymnase, where on April 24, 1837, she made er public début under the name of Rachel in La *Vendéenne*, a vaudeville written for her by Paul Duport. Whether the part was not adapted to her, or she had not yet acquired confidence in her own powers, the performance attracted little attention, and for upward of a year she did not again appear prominently before the public. In the mean time she studied assiduously under Samson, an actor and author of great experience, and on Sept. 7, 1838, startled the Parisian public by a personation of Camille in *Les Horaces* at the *théâtre Français*, so full of originality and tragic intensity as almost to obliterate the traditions of former actresses in the same part. Her merit, however, might not have been immediately appreciated had not Jules Janin, in the *feuilleton* of the *Journal des débats* of Sept. 10, declared that the tragedies of Corneille and Racine had become reanimated by the genius of Mlle. Rachel. At her third appearance the receipts rose from about 300 francs on the first night to 2,048, a fabulous sum for a performance of a classical drama; and thenceforth she stood alone on the French stage, confessedly the first actress of the day, and never probably rivalled in her peculiar walk of tragedy. The long neglected plays of Corneille, Racine, and Voltaire were speedily revived for her, and she appeared with peculiar success as Émilie in *Cinna*, Hermione in *Andromaque*, Ériphile in *Iphigénie*, Monime in *Mithridate*, Aménaïde in *Tancrède*, Roxane in *Bajazet*, Pauline in *Polyeucte*, Agrippine in *Britannicus*, Electre, Athalie, and Phèdre, the last being one of her greatest triumphs. In personating these characters she paid little regard to the cherished traditions of the stage, and the actors performing with her were frequently confused and even startled by tones and gestures so different from those established by custom as to appear to them wholly foreign to the play. The studied declamation of the old school was exchanged for an utterance at once natural and impressive, and the expression of her face, her gesture or attitude, scarcely less eloquent than her voice, conveyed a fulness and force of meaning which made each part a new creation in her hands. She excelled in the delineation of the fiercer passions, but jealousy and hatred were so subtly interpreted, that the mind was even less affected by what she expressed than by what she left to the imagination. A circumstance which contributed powerfully to her success was the rapidity with which she reached the full development of her powers; and others beside Janin were astonished that an obscure young Jewess, without education or assistance, should, as if by instinct, suddenly master the chief productions of French dramatic literature, and reveal in them beauties previously unsuspected. For several years she contented herself with performing in the old classic drama; but finding that the limited round of characters she assumed afforded her rivals a pretext for denying her the comprehensiveness and versatility of a great actress, she gradually formed a distinct *répertoire* from the works of modern and contemporary dramatists, in which she appeared with varying success. In *Judith*, by Mme. de Girardin, *Catherine II.*, *Virginie*, and *Le vieux de la montagne*, she made little impression; but in *Jeanne d'Arc*, *Marie Stuart*, and particularly in *Adrienne Lecouvreur*, a play adapted expressly to her talents by Scribe and Legouvé, she renewed the triumphs of Camille and Phèdre. The revolutionary outbreak of 1848 afforded her an opportunity for a remarkable performance, half spoken, half sung, of the *Marseillaise*. Subsequently she appeared in *Cléopâtre* and *Lady Tartufe*, written for her by Mme. de Girardin, in Victor Hugo's *Angelo*, in Dumas' *Mlle. de Belle-Isle*, in *Diane*, *Louise de Lignerolles*, and in Scribe's *Czarine*, which was the last new part studied by her. In none of these perhaps did she so completely satisfy her auditors as in the severe and lofty tragedy of the classic period, with which her genius seemed to have a close sympathy. Her theatrical income, originally 4,000 francs, soon rose to 80,000; and in 1849 she effected an arrangement at the *théâtre Français*, by which 6 months of absence in each year were allowed her. The receipts from her performances in the provinces and in England reached enormous sums, and during an engagement in Russia in 1853 she received 400,000 francs as her share. These emoluments, however, were gained at the expense of her health, which suffered under the fatigues of so arduous a life. In 1855, in company with her brother Raphael Félix and her sisters Sarah, Lia, and Dinah, and a complete *troupe* of actors and actresses, she made a professional visit to the United States, and first appeared before an American audience at New York as Camille in *Les Horaces*. She was interrupted in the midst of great success by the failure of her health; having played many times in New York and Boston, in which two places she cleared some $60,000, and then once in Philadelphia and once in Charleston, she went to Havana in a vain effort to regain her strength through the mildness of the climate, but finally returned to France a heavy loser and with little hope of recovery. She spent the following winter in Egypt, but all attempts to arrest the progress of her disease (consumption) proved unavailing. Rachel was slender, rather tall, and exceedingly graceful, with a finely modelled head, clear, pale complexion, and features full of expression. Her attitudes and movements were of surpassing beauty, and her voice was singularly deep, rich, and affecting. Though never married, she left two sons, one of whom, acknowledged as the son of M. Walewski, himself an illegitimate son of Napoleon I., has been ennobled as the count of Étiolles by Napoleon III.

RACINE, a S. E. co. of Wisconsin, bordered E. by Lake Michigan and drained by Des Plaines, Fox, Pike, and Root rivers; area, about 350 sq. m.; pop. in 1860, 21,368. It has a nearly level surface, principally prairie, and a very fertile soil. The productions in 1850 were 218,149 bushels of wheat, 78,847 of Indian corn, 175,655 of oats, 58,279 of potatoes, and 232,466 lbs. of butter. There were 6 saw mills, 2 tanneries, 5 newspaper offices, 18 churches, and 3,756 pupils attending public schools.—RACINE, the capital, is situated at the mouth of Root river on Lake Michigan, and on the line of the Chicago and Milwaukee railroad, 23 m. S. from the latter and 62 m. N. from the former; pop. in 1860, 7,822. It is built on a plain about 30 feet high, and has one of the best harbors on the lake, admitting vessels drawing 12 feet of water. The city is regularly laid out and well built. It contains a number of public offices, and is the seat of Racine college (Episcopal), founded in 1852. There are a number of manufactories, furnaces, machine shops, 3 ship yards, and 14 churches, viz.: 2 Baptist, 2 Congregational, 1 Episcopal, 1 German Evangelical, 1 German Lutheran, 3 Lutheran, 1 Presbyterian, 2 Roman Catholic, and 1 Universalist.

RACINE, JEAN, a French tragic poet, born at Laferté-Milon, Dec. 21, 1639, died in Paris, April 22, 1699. At the age of 16 he was admitted to the select school under the direction of the recluses of Port Royal, where he remained for 3 years studying the classics, and especially Greek, with eagerness. In 1660, on the marriage of the Spanish infanta Maria Theresa to Louis XIV., he dedicated to her an ode entitled *La nymphe de la Seine*, for which he received 100 louis and a pension of 600 livres. His relations insisted upon his becoming a priest; and accordingly he repaired to Uzès, where for several months he lived with his uncle, a canon, who promised him a benefice. But he could not give up poetry, and at last returned to Paris, where he published, toward the end of 1663, an ode, *La Renommée aux Muses*, which introduced him to the acquaintance of Boileau. A little before this he had been encouraged by Molière, who suggested the plan of his first tragedy, *La Thébaïde, ou les frères ennemis*. This play, performed in 1664, although it showed no striking merits either in construction or execution, was favorably received. *Alexandre*, brought out in the following year, was still more successful. In his *Andromaque* (1667) he first proved his real genius. In 1668 his 3-act comedy of *Les plaideurs*, a very lively imitation of the "Wasps" of Aristophanes, was performed; and in 1669 *Britannicus*, a masterly adaptation of some of the most powerful pictures of Tacitus. About this time Henrietta of England, wishing to place the veteran Corneille and his young rival in competition with each other, privately requested each to write a tragedy founded upon the illicit love of the emperor Titus and Queen Berenice. Unfit for the stage as such a subject was, the two poets eagerly accepted it. Racine succeeded in producing a series of touching scenes, embellished by the most exquisite poetry, so that his *Bérénice* has been properly styled a beautiful elegy in 5 acts; but the *Tite et Bérénice* of Corneille was a complete failure. Racine now wrote in succession 3 other tragedies: *Bajazet* (1672), which, contrary to all precedents, was founded on a contemporary occurrence in the Ottoman empire; *Mithridate* (1673); and *Iphigénie en Aulide* (1674), a remodelling of one of the plays of Euripides, which was pronounced by Voltaire the masterpiece of the French stage. *Phèdre*, which was produced three years later, is considered by some critics superior to *Iphigénie*. The duke of Nevers, the duchess of Bouillon, Mme. Deshoulières, and several other literary characters now put forward as a competitor to Racine a third rate poet named Pradon, for whose *Phèdre et Hippolyte* they secured popularity, while they managed to keep the public away from the theatre in which the true *Phèdre* was performed. This injustice inflicted a severe wound upon Racine's sensibility; and having married a very devout wife, and possessing in his office as royal historiographer a comfortable means of support, he resolved to cease writing for the stage, and devote his time to religious exercises, the education of his children, and the preparation of a history of the reign of Louis XIV. The manuscript of this work, which was never quite completed, was lost in a fire in 1726, with the exception of a fragment including 6 years, from 1672 to 1678. In the mean time Racine had acquired the favor of Mme. de Maintenon, who persuaded him to compose a drama to be acted by the pupils of the royal female seminary of St. Cyr. He therefore wrote in 1689 his biblical drama of *Esther*, in which he introduced choruses, and the performance was a decided success. The poet, encouraged by Mme. de Maintenon, undertook another play of the same kind, but of wider scope and proportions; the subject he chose was the fall of Athaliah. This was his last dramatic composition. Mme. de Maintenon now had doubts about the propriety of dramatic performances by the young ladies under her care; and when *Athalie* was completed in 1691, she caused it to be recited merely twice in a private room without costumes or scenery. When the ose was printed, it was scarcely noticed by e public. Boileau consoled his friend under e disappointment. "This is your finest work," said, "and the public will acknowledge it in e end." The prophecy was fulfilled, but not ing the poet's life. *Athalie* had to wait 25 ars to be performed at the *théâtre Français,* d it was not until about the middle of the th century that full justice was done to it. y the advice of Mme. de Maintenon, Racine w wrote a memoir in which he vividly de- cted the unhappy condition of France, and ggested some reforms at which Louis XIV. s highly offended; and his displeasure is d to have weighed so heavily upon Racine's nd as seriously to aggravate a disease of the er under which he had been suffering for veral years. He pined away, and at the d of a year or two breathed his last. He s buried, according to his desire, in the metery of Port Royal; and on the destruction the convent in 1711, his remains were trans- rred to the church of St. Étienne du Mont, Paris, where they now rest.—Beside his amatic works, Racine left prose writings rked by terseness, perspicuity, and elo- ence. This last quality is peculiarly strik- g in his speech before the French academy the reception of Thomas Corneille on Jan. 1685, when he paid a magnificent tribute of miration to the genius of the latter's great other. He also wrote a short sketch of the story of Port Royal, and two satirical letters answer to certain strictures of his old mas- rs upon dramatic poets. His familiar letters, ost of them addressed to his son or to Boi- au, are couched in an easy and elegant style. ost of his miscellaneous poems, consisting of es, *cantiques spirituels,* and epigrams, are a very high order of merit. The editions his complete works are many, and those of tragedies are numberless. The most con- nient of the latter are those published by dot under the supervision of Lefèvre, in the *hefs d'œuvre du 17e siècle* (2 vols. 8vo.), and the *Chefs d'œuvre de la littérature Française* vol. 12mo.), and the *variorum* edition by uandre. The most valuable editions of his *uvres complètes* are those of Pierre Didot the der (3 vols. fol., Paris, 1801-'5), with 57 en- avings by the first artists of the time, form- g a part of that magnificent collection known the *éditions du Louvre;* La Harpe (7 vols. o., Paris, 1807); Geoffroy (7 vols. 8vo., 09); and Aimé Martin, with notes selected om all the commentators (7 vols. 8vo., Paris, 30).—Louis, the son of the preceding, a ench poet and miscellaneous writer, born in ris in 1692, died in 1763. He was a pupil Rollin and a man of great piety. He wrote o didactic poems: *La grâce* (1722 or 1720), hich embodied the principles of Jansenism on the subject; and *La religion* (1742). th these poems, the latter especially, are re- arkable for clearness of composition and ele- nce of style, but are sadly deficient in point of power, greatness and imagination. The same may be said of his *Odes sacrées* and *Poésies diverses.* He wrote *Mémoires sur la vie et les ouvrages de Jean Racine* (2 vols. 12mo., 1747), decidedly to us his most valuable performance, a prose translation of Milton's "Paradise Lost," and other works. The best edition of his works is that of Lenormand (6 vols. 8vo., Paris, 1808). His poems have been published separately, and are still reprinted.

RADACK AND RALICK, names given by the natives to two chains of islands in the Pacific ocean, which, together with Brown's range, form the Marshall archipelago, extending from lat. 4° 45′ to 12° N., and from long. 160° to 177° E., and separated from the Gilbert or Kingsmill group by a channel about 120 miles wide. The Radack chain includes among other islands the Mulgrave, Mindi, Tagia, and Dawson groups; and the Ralick comprehends the Boston, Benham, Elmore, Schantz, and Eschsoltz. Most of these groups are composed of atolls connected at low water and separated by the sea at high tides; and the whole have the usual character of coral islands. The outer side of the reefs is unfathomable, and the lagoons within are more or less shallow. Some of these lagoons are very extensive, and are navigable for vessels of every description; but there are few passes sufficiently large to admit ships drawing much water. The principal productions of the islands are the cocoanut, breadfruit, pandanus, and taro. The Marshall archipelago is well peopled, and on some of the groups the inhabitants are very numerous. They are an able-bodied race of a copper color, and in general appearance have a strong resemblance to Malays. They have large canoes, and upon several occasions have made combined attacks upon vessels.—These islands were discovered by Captains Marshall and Gilbert, of the British navy, in 1788, on the passage from Sydney to China, after having landed the first settlers in Australia; and as Capt. Marshall was the principal officer of the expedition, his name has been applied by Krusenstern and others to the whole archipelago, while that of Capt. Gilbert has been given to the group lying to the S. There is considerable confusion in the original accounts, Gilbert having named some of the islands already named by Marshall; and Capt. Bishop, who 10 years afterward visited them and also named them, added thereby to the difficulty, which has been augmented by discrepancies in the longitudes given by all these officers.

RADCLIFFE, Ann, an English novelist, born in London, July 9, 1764, died there, Feb. 7, 1823. Her maiden name was Ward. At the age of 23 she married Mr. William Radcliffe, a student of law, who afterward became the editor and proprietor of "The English Chronicle," a weekly newspaper. Her first novel, "The Castles of Athlin and Dunbayne" (1789), gave little indication of her future powers, though it possessed the wild and improbable plot and the unnatural characters which distinguish her later writings. The "Sicilian Romance" (1790) is much better, and the "Romance of the Forest" (1791) is sufficient of itself to place her at the head of all writers of melodramatic romance. "The Mysteries of Udolpho" (1794) is generally regarded as her masterpiece. About the time this work was produced she made a tour through Germany, and in 1795 published her "Journey through Holland," &c., with some observations on the lake district of England. Her last novel, "The Italian," which deals with racks, tortures, dungeons, confessionals, monks, and inquisitors, appeared in 1797. One of her peculiarities is the care with which toward the close of her stories she usually explains all their mysterious incidents by natural and puerile agencies. A posthumous romance, "Gaston de Blondeville," was edited by Thomas Noon Talfourd (1826); and a collection of her poems, of which there are many scattered through her novels, appeared in 1834.

RADCLIFFE, John, an English physician, born in Wakefield, Yorkshire, in 1650, died Nov. 1, 1714. He was graduated at University college, Oxford, in 1691, studied medicine, and in 1675 began to practise in Oxford. In 1682 he received the degree of M.D., and in 1684 removed to London, where he soon acquired an extensive practice. He was appointed principal physician to the princess Anne in 1686, and in 1713 was elected to parliament by the town of Buckingham. Many anecdotes are recorded of his wit and rudeness of speech, which sometimes verged upon brutality. He was sent for to attend Queen Anne when she lay at the point of death; but knowing the case to be desperate, and being himself ill, he did not go. The feeling this excited against him is thought to have hastened his death. He bequeathed nearly his whole fortune to public uses, dividing it mostly between University college, Oxford, and the foundation at Oxford of a library with especial reference to medical science. This is known as the Radcliffe library.

RADETZKY, Joseph Wenzel, count, an Austrian general, born at Trzebnitz, Bohemia, Nov. 2, 1766, died in Milan, Jan. 5, 1858. He entered the Austrian army in 1784 as cadet in a regiment of Hungarian cavalry, and served in the campaigns of 1788–'9 against the Turks, and of 1792–'5 against the French in the Netherlands and on the Rhine. In 1796 he was aide-de-camp of Beaulieu in the army of Italy, and on May 29 was raised to the rank of major and commander of the pioneer corps. On the renewal of the war in 1799 he again served in Italy as aide of Melas, and for his ability and gallantry was made lieutenant-colonel. Recalled from Italy in Sept. 1800, he was placed at the head of the regiment of Archduke Albert cuirassiers, and with them was engaged in the battle of Hohenlinden. In 1805 he was made a major-general, and acted under Davidovitch in Italy. In the campaign of 1809 he commanded the 5th division of the army, and for his great
services, especially at the battle of Wagr
raised to the rank of lieutenant field
After the peace he was made chief of t
termaster-general's staff, and councill
minister of war, in which capacity h
large share in the reorganization of t
In the campaigns of 1813–'14 and 1815
chief of the staff of Field Marshal Sch
berg, participated in the battle of K
success of which was in great measure
his conduct, and drew up the plan of the
of Leipsic, in which he was severely w
After the close of the war he was sta
Oedenburg, subsequently in Buda, and
1821 was appointed commander of O
having a short time previous been m
eral of cavalry. There he remained un
when he was sent to Italy to take comm
the Austrian troops in that country.
1836 was raised to the dignity of field
It was here that he made himself m
cially famous by his conduct in suppr
Italian rebellion which broke out in 18
news of the revolution in Paris and th
throw of the government at Vienna
ately stirred up an insurrection in Mila
from March 18 to March 23 combats
the Austrian troops and the insurgents
stantly took place in the streets. On th
mentioned day Radetzky, finding his
worn out and overborne, evacuated Milan
began his retreat to Crema. Nothing da
by an equally successful outbreak in V
he hoped to maintain himself on the li
the Adda; but the spread of the insurr
throughout the north of Italy, and the ju
of the revolutionists with the army of C
Albert, king of Sardinia, which had bee
preparing for an attack on the Aust
rendered it necessary to retreat behind
Mincio, head-quarters being established at
rona. The advance of Charles Albert at
head of a large army compelled him to r
behind the Adige. Here an indecisive
was fought at the village of Santa Lucia
May 6, and on the arrival of the Aust
reserve he endeavored, but in vain, to raise
siege of Peschiera, closely invested by
troops of the king of Sardinia. The fall of
fortress on May 31 rendered his position exc
ingly critical, and his embarrassment was
further increased by the progress of the rev
tion in Vienna. In this situation the gener
ship of Radetzky showed itself in a m
marked manner. Feigning a general retr
he took the road to Vicenza, reduced that
Treviso, and Padua, thus securing his rear, and
rapidly returned to Verona. After a short de-
lay offensive operations were begun on b
sides. The victory of Custozza (July 25) for
the Piedmontese to retreat, and from this ti
the success of the Austrians was assured. M
capitulated on Aug. 6, and an armistice of 6
weeks was agreed upon between Sardinia
Austria. Charles Albert having resumed h
tilities, Radetzky invaded Piedmont, and

March 23, 1849, a battle took place at Novara between the contending forces, in which the Austrians were entirely victorious. The result of this conflict decided the war, and from this point Radetzky marched against Venice, which after a protracted siege finally surrendered, Aug. 28. Radetzky was made governor-general and military commander of the whole country, the duties of which situation he performed with zeal and unmitigated rigor. When war was imminent between Austria and Prussia in 1850, he was called to Vienna to prepare the plan of the campaign, but soon returned. In 1856, at the age of 90, he was released at his own request from his command, the duties of which he had become too feeble to discharge. He bore the reputation of a brave soldier and a consummate tactician, and was decorated with the insignia of nearly all the military orders in Europe. His only surviving children are the count Theodore de Radetzky, a colonel in the Austrian service, and the baroness Wenkheim.

RADISH (Lat. *radix*, root), the name of a salad plant, a native of China, belonging to the natural order of *cruciferæ*, which comprises a great number of useful species, all distinguished by the form of their flowers. The petals are 4 in number and arranged crosswise, the stamens 6, the 2 lower shorter, and the fruit either a flat and circular, or else a long, tapering, cylindrical, and jointed pod. The radish was introduced into England during the 16th century, 4 sorts being cultivated by Gerard in the latter part of the reign of Queen Elizabeth. The stem of the garden radish (*raphanus sativus*, Linn.) grows 3 to 4 feet high, and branches outwardly; its leaves are lyrate, sublyrate, and rough; its flowers are white tinged with purple; its pod uneven, tapering to a point, of 2 or 3 cells, and as long as the stalk. In shape the root is either fusiform or globular. As this is usually eaten in a raw state, it is desirable that it should have a crisp and clear flesh, which can be produced by growing rapidly. Sometimes however the root is boiled and served like asparagus. The young leaves make a very good pot herb when boiled, and the tender pods are employed in making pickles. There are a great many varieties and sub-varieties suitable to every season of the year. Those called spring and summer kinds may be brought forward early by forcing in hot-beds or sowing in frames. The autumn and winter kinds are sown in July and taken from the ground before the frosts spoil them, and stored away like carrots. When cultivated in the open air in private gardens, a warm, moist, good, well pulverized soil, that is free from stones, should be selected, and the seed sown in drills; or the seeds may be sown between the rows of asparagus beds, and when the young plants show the rough leaves they should be thinned and kept clear of weeds. If continuous crops are needed through the season, renewed sowings every fortnight may be resorted to. The following names indicate some of the best kinds of fusiform radishes, viz.: *early frame, short top*, long salmon, long purple, long white, &c. The globular are known as *scarlet turnip*, white Dutch turnip, purple turnip, &c.; the autumn radishes are sub-varieties of the black Spanish radish, the leaves of which are long and spreading, the root of an oval shape and of large size, its color black, its flesh solid, white, and of a hot flavor. There are several kinds of this in much esteem as being more or less hardy, of a more pungent or of a milder taste, and of different color of the skin. A tendency in all cruciferous plants to run into each other or hybridize, suggests the importance of keeping the sorts apart, if pure varieties are desired. —A distinct variety known as oil radish (*R. s. oleifer*, De C.), growing 6 to 24 inches high, is very much branched, with abundance of pods, from the seeds of which is expressed an oil similar to that of the rape, but not so readily obtained. It is however extensively cultivated in China for this purpose. The tree radish (*R. caudatus*, Linn.), a native of Java, is remarkable for the length of the pods, which measure more than the plant. The roots of the sea radish (*R. maritimus*, Smith) are preferred to those of horse radish for pungency; its leaves are liked by cattle. In the United States the radish shows a tendency to become naturalized, while the charlock or wild radish (*R. raphanistrum*, Linn.) is a troublesome weed.

RADNORSHIRE, a county of S. Wales, bounded N. E. by Montgomery, N. by Shropshire, E. by Hereford, S. by Brecknock, and W. by Cardiganshire; area, 425 sq. m.; pop. in 1851, 24,716. The chief towns are Presteigne, Knighton, Radnor, and Rhayader. The Wye and its tributary the Elan are the principal rivers. The surface is mountainous, the highest point being 2,163 feet above the sea; but the S. E. part is in general level. A great portion of the county consists of common bog and moor land. Numbers of small ponies are reared. The county contains many remains of antiquity. It originally formed part of the territory inhabited by the Silures, and, after its subjugation and ultimate abandonment by the Romans, was included in one of the petty principalities into which Wales was divided. It was formed into a county in the reign of Henry VIII. The county returns one member to parliament, and one for the principal towns.

RADOM, a government of Russian Poland, separated W. and N. from the government of Warsaw by the Pilica, and E. from that of Lublin and S. from Galicia by the Vistula, and with its S. W. corner bordering on Prussian Silesia; area, about 6,000 sq. m.; pop. 950,000. It is drained by the affluents of the Pilica and Vistula. The soil is diversified, and the surface the most elevated in the kingdom of Poland, being slightly mountainous in the S. E. part. The capital, Radom, is situated in the N. E. part on a small tributary of the Vistula; pop. 8,000.

RADOWITZ, Joseph von, a Prussian general and statesman, born in Blankenburg, Feb. 6, 1797, died in Berlin, Dec. 25, 1853. He received his military education in Paris and in Westphalian schools, and on account of his proficiency in mathematics was appointed in 1813 an officer in the Westphalian artillery. At the battle of Leipsic he was wounded and taken prisoner. Upon the dissolution of the kingdom of Westphalia he entered the service of the elector of Hesse-Cassel, and partook in the campaign against France with the Hessian artillery. After the peace he was made teacher of mathematics and military science at the school of cadets in Cassel, but finally quitted the Hessian service for that of Prussia. There he became captain in the general staff, teacher of Prince Albert, in 1828 major, and in 1830 chief of the general staff of the artillery. By his marriage with the countess Maria von Voss, he became a member of the highest aristocracy of Prussia, and also a favorite of the crown prince, afterward Frederic William IV. In 1836 Radowitz was made minister plenipotentiary to the Germanic diet at Frankfort, but in 1839 the prospect of a war with France led to his recall to Berlin, and to his being sent to the court of Vienna. In 1842 he was made ambassador extraordinary and minister plenipotentiary to the courts of Carlsruhe, Darmstadt, and Nassau, and in 1845 was created major-general. After the revolution of 1848 he was elected to the Frankfort parliament, and there became the leader of the extreme conservatives. After the revolution he entered the Prussian cabinet as minister of foreign affairs, and the adoption by the king of his political views, which aimed at a consolidation of northern Germany under the lead of Prussia, led to a difference between that power and Austria, which in the autumn of 1850 came near leading to an open war. At length Prussia retreated from its position, and Radowitz left the ministry. In Jan. 1851, he retired to Erfurt, and in 1852 was recalled by the king of Prussia and made director of military studies, but took no part in political life. He wrote on mathematical, military, and political subjects. His "Collected Works" appeared in Berlin in 5 vols. in 1852–'3.

RADZIWILL, the name of one of the oldest and most distinguished princely families of Lithuania. The first of the family appears in 1405 as marshal of Lithuania, and in 1518 the emperor Maximilian I. made the palatine of Wilna and chancellor of Lithuania, Nicholas III. Radziwill, a prince of the empire; and in this station he was confirmed by Sigismund I., king of Poland. When this line died out, the same honor was conferred upon the members of another branch, Nicholas the prince of Birze and Dulimki, and Nicholas IV. and John, princes of Olyka and Nieswiez; and from Nicholas IV., surnamed the Black, who is renowned as a promoter of the reformation in his country, and died in 1565, the present house is descended. Many of the family have made themselves widely known, but the most guished in later times are the three ing. I. **Anthony Henry**, prince of O. Nieswiez, born June 13, 1775, died lin, April 7, 1833. He married in 1 only daughter of Prince Ferdinand of sia, and became in 1815 Prussian gover the grand duchy of Posen. He was guished for his acquaintance with math and music, and the music to which he poetry of Goethe's "Faust" gained hi reputation. His two sons are now in Prussian service. II. **Michael Geron**, b of the preceding, born Sept. 24, 1778, d 21, 1850. He served under Poniatowski Kosciuszko (1794), and Dombrowski and in the campaign of 1812 against commanded a regiment in the grand ar Smolensk and in the battles of Vitepsk a lotzk he manifested such daring coura Napoleon made him a brigadier-gene the Polish revolution of 1830–'31, when picki had laid down the dictatorship, h appointed commander-in-chief in Jan. 18 he distrusted his own abilities, and the of the battles of Dobre, Grochow, and which followed, belongs more to his subor than to himself. At his own wish, on F Skrzynecki was made commander, and will entered the ranks. After the capt Warsaw he was conveyed into the inter Russia and there held until 1836, and after time lived in Dresden. III. **Leo**, nephew preceding, born March 10, 1808, was an in the Polish guard at the outbreak of th lish revolution of 1830–'31, but remained ful to Russia, and during the campaign served against his countrymen. As a re he was promoted in the army, and when in he married the princess Sophia Uronssoff ceived the confiscated estates of his uncle chael. His property, now immense, was v at 10,000,000 rubles. In Aug. 1849, he sent to Constantinople on a special missi obtain from the Porte the surrender of Hungarian refugees who had fled to Turkey.

RAEBURN, Sir Henry, a Scottish pai born in that part of Edinburgh formerly Stockbridge, March 4, 1756, died July 8, In early life he was apprenticed to a goldsm but evincing a great taste for art he was abled to cancel his articles, and to comme the practice of portrait painting in Edinbur where he soon became a rival of David Mar who then stood at the head of this branch the art. Subsequently, by the advice of Joshua Reynolds, he made a visit to Rom Returning to Edinburgh in 1787, he at became the leading portrait painter of th Scottish metropolis, a supremacy which h maintained until the close of his life. Amo his sitters were Sir Walter Scott, of whom h painted several portraits, Henry Macken Dugald Stewart, Lord Eldin, George IV., Pro fessor Playfair, Dr. Hugh Blair, Jeffrey, A son, and many others distinguished in liter er and in political life. In 1814 he was ected an associate and in 1816 a member of e royal academy; and in 1822 he was knight- by George IV.

RAFFAELLE. See Raphael.

RAFFLES, Thomas, an English dissenting ergyman, born in London, May 17, 1788. e studied theology at Homerton college near ondon, and in 1809 was ordained minis- e of the Congregational church at Hammer- ith. Here he remained 8 years, at the end which time he was called to take charge Great George street chapel in Liverpool. e has written a number of popular works, mong which are some poems, a memoir of is predecessor the Rev. Thomas Spencer, d "Letters during a Tour through some part France, Savoy, Switzerland, Germany, and e Netherlands" (1817). He has also pub- shed sermons, and a large number of fugi- ve articles. He retired from the pulpit in ec. 1860.

RAFFLES, Sir Thomas Stamford, an Eng- sh official, born at sea, off Jamaica, July 5, 781, died July 5, 1826. He was an assistant erk in the India house at the age of 15, and 1805 was appointed under secretary to the ew government formed by the East India ompany at Penang. He afterward became hief secretary; but intense application to busi- ess affected his health, and in 1808 he was ompelled to go to Malacca. In 1809 he pub- shed an essay "On the Malay Nation." It as by his advice that the expedition was fitted ut against Batavia in 1811, and when that lace was captured he was appointed lieutenant- overnor of Java and its dependencies. He eld this office for 5 years, during which slavery as abolished; and upon his return to England e published a "History of Java" (1817). In 818 he was made lieutenant-governor of Fort Marlborough, the seat of the English govern- ent at Bencoolen, Sumatra, and remained 6 ears in this position, emancipating the slaves ere also. He established the British settlement t Singapore, and founded a college there for he encouragement of Anglo-Chinese and Malay terature. The state of his health compelled im in 1824 to resign and return to England, where he founded the present zoological so- iety, of which he was the first president. His "Life and Remains" were edited by his widow 4to., London, 1830).

RAFINESQUE, C. S., an American botanist, orn in Galata, a suburb of Constantinople, in 784, died in Philadelphia, Sept. 18, 1842. His ather was a merchant in the Levant from Mar- eilles, and the son was carried to that city when 7 years of age, thence taken to Italy, and, fter residing in various cities in the northern art of that country, came in 1802 to America. Having collected a large number of botanical pecimens, he returned in 1805 to Leghorn, whence he went to Sicily, where he remained 0 years. While there he published a work in French, entitled "The Analysis of Nature." Sailing for New York in 1815, he was shipwrecked on the coast of Long Island, and lost, as he says, "my fortune, my share of the cargo, my collections and labors for 20 years past, my books, my manuscripts, my drawings, even my clothes." He became teacher in a family, and in 1818 made a tour to the West, and was for a time professor of botany in Transylvania university, Lexington, Ky. Finally he settled in Philadelphia, and established in 1832 a periodical called "The Atlantic Journal and Friend of Knowledge, a Cyclopedic Journal and Review," which, according to the prospectus, was to "contain every thing calculated to enlighten, instruct, and improve the mind." Only 8 numbers were published. In 1836 appeared his "Life of Travels and Researches," giving an account of the places he had visited. He also wrote several botanical works.

RAFN, Carl Christian, a Danish archæologist, born in Brahesborg, Island of Fünen, Jan. 16, 1795. He was educated at the university of Copenhagen, of which in 1821 he was made an assistant librarian; and while in that position he undertook a general revision of all the Icelandic and Norwegian manuscripts yet unpublished, belonging to the collection. Through his exertions the "Society for Northern Antiquities" was founded, the principal object of which was to publish those manuscripts which could throw any light on the obscure passages of Scandinavian history. It has already published about 70 volumes on the history and antiquity of the North. The work which excited the most attention was the *Antiquitates Americanæ, sive Scriptores Septentrionales Rerum Ante-Columbianarum in America* (Copenhagen, 1837), prefaced by a summary in English, in which he attempted to prove that the Scandinavians discovered America in the 10th century, and that from the 11th to the 14th they made frequent voyages to the western hemisphere, and effected settlements in what is now Massachusetts and Rhode Island. An important sequel to this work is the "Historical Monuments of Greenland" (3 vols., Copenhagen, 1838–'45). Of his *Antiquités Russes* 2 volumes appeared in 1850–'52. As secretary of the society for northern antiquities he has had much to do with preparing its various publications for the press, and has also been the translator and editor of other works.

RAGLAN, James Henry Fitzroy, baron, an English general, born Sept. 30, 1788, died in camp before Sebastopol, June 28, 1855. He was the 8th and youngest son of the 5th duke of Beaufort, and grandson on his mother's side of Admiral Boscawen. He was educated at Westminster school, and at the age of 16, being then known as Lord Fitzroy Somerset, entered the 4th regiment of dragoons as ensign. In 1805 he became lieutenant, in 1807 accompanied Sir Arthur Paget in the embassy to Constantinople, and subsequently became attached to the staff of the duke of Wellington as aide-de-camp and military secretary. In this position he participated in all the duke's engagements during the peninsular war, manifesting great intrepidity on various occasions, especially at Salamanca, Vittoria, Orthez, and Toulouse. At Busaca he was wounded, and at the storming of Badajoz he was one of the first to enter the town. At Waterloo he lost his right arm. In return for his services he was made colonel and knight commander of the bath. In 1814 he was for a short time secretary of embassy at Paris; from January to March, 1815, he acted as minister plenipotentiary, and subsequently he was secretary again until 1819, when he became military secretary to the duke of Wellington, and held this post until 1827, when in the same capacity he followed the duke to the horse guards. From 1818 to 1826 he represented the borough of Truro in parliament, where he acted with the moderate tories. After the death of the duke of Wellington he was made master-general of the ordnance, and elevated to the peerage (1852), with the title of Baron Raglan. When the war with Russia broke out, he was appointed by Lord Aberdeen to command the army sent to the East, and promoted to the rank of field marshal. In March, 1854, he left England, in September reached the Crimea, and on Sept. 20 fought in conjunction with Marshal St. Arnaud the battle of the Alma. During the following winter the allied troops perished in large numbers in the trenches before Sebastopol, and his anxiety in regard to the condition of the men and the attacks of the English press upon his military movements weighed heavily upon his spirits. In this state of mind he was seized with the cholera, and soon died. His body was taken to England and buried in Badminton church, Gloucestershire. A pension of £1,000 was settled for life upon his widow, and £2,000 upon his son.

RAGUET, Condy, an American merchant and political economist, born in Philadelphia, Jan. 28, 1784, died there, March 22, 1842. He was of French descent, was educated at the university of Pennsylvania, and for 18 months after his graduation pursued the study of law; but the death of his father leaving him dependent upon his own exertions, he entered the counting house of a merchant, and at the age of 20 was sent to St. Domingo as supercargo of a vessel. There he spent 4 months, and on his return published a work entitled "A Short Account of the Present State of Affairs in St. Domingo." After a second voyage to the same island in 1805, when he remained there 8 months, he published "A Circumstantial Account of the Massacre in St. Domingo." In 1806 he went into business on his own account, was highly successful, and became manager or president of several important commercial institutions. In 1815 he was elected a member of the lower house of the Pennsylvania legislature, and subsequently of the senate, and in 1822 was appointed by President Monroe consul at Rio Janeiro. Not long after he negotiated a commercial treaty with Brazil, and by President Adams was made chargé d[illegible] to that country. There he remained 5 y[illegible] and upon his return to the United Stat[illegible] several journals devoted to free trade d[illegible] He published "Principles of Free Trad[illegible] Philadelphia, 1835), and a treatise "[illegible]rency and Banking" (1839), which was [illegible]lished the same year in England, and wa[illegible] translated into French.

RAGUSA (Slav. *Dubrovnik*), a forti[illegible] port city of Austria, capital of a distric[illegible] same name, province of Dalmatia, situat[illegible] small peninsula of the Adriatic, abou[illegible] N. N. W. from Cattaro, in lat. 42° 38′ [illegible] long. 18° 7′ E.; pop. 6,000. It is buil[illegible] at the foot and partly on the declivity of [illegible] Sergio, so that the upper streets are co[illegible] with the lower by steps. The harbor [illegible] S. is small and exposed to the sirocco; [illegible] the N. side of the peninsula, 2 m. distant [illegible] harbor of Gravosa, which is large en[illegible] admit ships of the line.—Ragusa was f[illegible] in the 7th century, being peopled by Sla[illegible] Italian settlers, and formed down to [illegible] times an aristocratic republic, which flo[illegible] successively under Greek, Venetian, Hun[illegible] and Turkish protection. After the pea[illegible] Presburg in 1805 it was occupied by the Fr[illegible] In 1806 the Montenegrins and Russians o[illegible] its territory, and besieged the French wi[illegible] walls. It was subsequently created by [illegible]leon a dukedom for Marmont, and incorp[illegible] with the new kingdom of Illyria, with [illegible] in 1814 it came into the possession of A[illegible] The city has been frequently injured by [illegible]quakes. The latest earthquake was th[illegible] 1850.

RAHBECK, Knud Lyne, a Danish a[illegible] born in Copenhagen, Dec. 18, 1760, died A[illegible] 22, 1830. He was educated at the univer[illegible] of Copenhagen, where in 1790 he became [illegible]fessor of æsthetics. From 1798 to 1805 h[illegible] teacher of history in Christian's institute, f[illegible] 1806 to 1816 lectured to actors on the dra[illegible] art, and in 1809 became an active memb[illegible] the managing committee of the theatre. I[illegible] 1816 he was again a teacher in the univers[illegible] He was the most active and influential of th[illegible] literary men of Denmark, and wrote pla[illegible] tales, lyric poems, essays, and translati[illegible] The *Danske Tilskuer* ("Danish Spectat[illegible] 1791–1806), an imitation of Addison's "Spe[illegible]tor," is generally regarded as his best work.

RAHWAY, a city of Union co., N. J., on the Rahway river, 5 m. from its mouth, and [illegible] the New Jersey railroad, 19 m. W. from New York and 9 m. W. from Newark; pop. in 18[illegible] 7,130. It was formerly divided by the riv[illegible] into Upper Rahway, in Rahway townsh[illegible] Essex co., and Lower Rahway (form[illegible] Bridgeton), in Woodbridge township, Middle[illegible] co.; but it has now been consolidated and [illegible] in Union co., which has recently been formed. There are 87 different manufacturing est[illegible]lishments, producing annually to the value of $1,552,700; of these, 39 manufacture carria[illegible] the annual value of $902,000, and 5 clothing the amount of $920,000. It contains the lumbian academy, the Rahway female insti-te, 6 public schools, a bank, 3 newspaper ices, and 16 churches, viz.: 1 African, 1 Bap-t, 1 Episcopal, 2 Friends', 1 German Reformed, Methodist, 2 Presbyterian, and 1 Roman tholic. The river, a very small stream, will mit of the passage of vessels not exceeding or 60 tons. The settlement of this town s commenced about the year 1720.

RAIKES, Robert, an English philanthropist, e originator of Sunday schools in England, rn in Gloucester in 1735, died April 5, 1811. e received a liberal education, became asso-ated with his father as publisher and editor the "Gloucester Journal," and eventually cceeded to the business. The state of the unty bridewell attracted his attention, and made a strong and in some degree success-l effort to ameliorate the physical condition offenders of all grades confined there. But most earnest efforts were excited in favor the multitudes of poor children whom he und in the streets of the town abandoned to e practice of every vice. In 1781 he hired oms for Sunday schools, employed poor wo-en at a shilling a day to teach the children read, and was successful in inducing them attend. The movement became popular, d in a short time Sunday schools were estab-shed in all the larger towns of England.

RAIL, the proper name of the *rallinæ*, a sub-mily of wading birds of the family *rallidæ*. e genus *rallus* (Linn.) is characterized by a ll longer than the head, nearly straight and ender, with the culmen a little curved, and p obtuse and slightly notched; nostrils in a embranous groove which extends for ⅔ of the ll; wings short, with the 2d and 3d quills ual and longest; tail short and rounded; rsi shorter than the middle toe, covered with ansverse scales; toes long and slender, free the base, the hind one short; claws short nd sharp; forehead, as in all the sub-family, athered to base of bill, the culmen parting e frontal feathers for a short distance and in n angle. There are about 20 species, found n all the temperate parts of the globe, resem-bling each other in habits and much alike in lumage; they inhabit marshes and borders of vers, among reeds and aquatic plants, which heir long toes, sharp claws, and compressed odies enable them to climb and run over or etween with great facility; the flight is awk-ward and slow, with the legs hanging down, nd for short distances only except during mi-gration; they are good swimmers and divers, nd very rapid runners on the ground. Their od consists of worms, slugs, crustaceans, tad-oles, insects, leaves, and seeds of water plants; e nest is made of coarse grasses, and placed n retired marshes, and the eggs are 10 to 12. hey are very generally called marsh hens, as hey resemble domestic fowls in their manner f carrying the head, in some of their habits, and in their cackling notes. The largest of the North American rails, and one of the handsomest of the genus, is the red-breasted rail or the fresh water marsh hen (*R. elegans*, Aud.); it is about 19 inches long, the bill 2, and 24 in alar extent, with a weight of about 1¼ lbs.; the color above is olive brown, with longitudinal stripes of brownish black, especially on the back; throat and lower lid white; neck before and breast rufous chestnut; sides, lower parts, and under tail coverts with transverse bands of brownish black and white; upper wing coverts reddish chestnut, the under black with white lines. It is found in the middle and southern states on the Atlantic coast, probably extending across to the Pacific, and chiefly on the margin of fresh waters; it begins to breed in the southern states about the middle of April in its favorite marshes, surrounded by alligators and myriads of frogs, in places almost inaccessible and exceedingly unhealthy to man; the young leave the nest as soon as born, safe from man, but not from minks, wild cats, raccoons, owls, snakes, turtles, and other carnivorous animals. The females are like the males, but smaller; they do not take to the water willingly, and are rather poor divers; the flesh is good, especially in autumn, and their eggs are said to be delicious. The clapper rail or salt water marsh hen (*R. crepitans*, Gmel.) is about 14 inches long, with an alar extent of 20, and a weight of ¾ of a lb.; the adult plumage is considerably like that of the last species, but the upper parts have a light ashy olive tint, and the neck and breast are more yellowish. It is abundant from New Jersey to Florida, extending also to South America, and is rarely found far from the sea; the nest is deep and funnel-shaped, made of marsh plants and fastened to reeds above the ordinary high tide level; incubation lasts 14 days; the eggs are also excellent, and are collected by hundreds in New Jersey toward the end of spring. Following the edge of the tide, it searches among the reeds for small crabs (fiddlers), mollusks, the *fry* of fishes, aquatic insects, and the seeds of water plants; it makes a loud cackling noise; it is not a rapid swimmer, but is a good diver, and a very swift runner either on the ground or on floating weeds; its flight is slow and generally straight; though esteemed as food, other species are more sought after, especially the sora, in the middle states. The Virginia rail (*R. Virginianus*, Linn.) is about 10 inches long, with an alar extent of 14; it is like the others in form, and resembles *R. elegans* in color, hardly differing from it except in size. It is found throughout the temperate regions of North America from the Atlantic to the Pacific, most abundantly along the margins of rivers and bays on the Atlantic, migrating south in autumn; it is a very rapid runner and good swimmer, feeding both on salt marshes and fresh meadows, by day and night. It breeds from the beginning of March to the middle of June, according to latitude; like the other spe-

cies it is a good ventriloquist, seeming often to be far off when close at hand; the flesh is good eating in autumn and winter. The European water rail (*R. aquaticus*, Linn.) is fulvous brown spotted with black above, bluish ash below, and barred black and white on the sides. The habits are the same as in other species; the flesh is esteemed, though having rather a marshy flavor.—The genus *ortygometra* (Linn.) has been subdivided into *porzana* (Vieill.) and *crex* (Bechst.). In *porzana* the bill is shorter than the head, the primaries longer than the tertiaries, the tail short, and the legs robust; there are about 20 species in the temperate regions of the globe, with habits similar to those of *rallus*. Among the North American species may be mentioned the Carolina or sora rail (*P. Carolinensis*, Vieill.), so well known and so abundant as to be called "the rail" in the middle states; the length is about 9 inches and the alar extent 14; the color is greenish brown above, with longitudinal lines of black; behind the eyes, sides of neck, and breast bluish ashy, with round white spots on the latter; middle of abdomen white. It occurs throughout temperate North America on both shores, migrating southward in winter; it is rarely seen east of New York, though capable of rapid and protracted flight; in autumn it is abundant in the rice fields and fresh water marshes of South Carolina, skulking among the grasses and reeds in search of food, climbing with ease to the top of plants when forced by the tide; thousands are shot at this season on the James and Delaware rivers from boats, near the height of flood tide, and usually singly; sometimes they are knocked down by poles when dazzled by a bright light in the bow of a canoe. It is semi-nocturnal in habit; when migrating the flight is low and in compact flocks; instinct teaches them the last moment at which they can remain in the autumn, all migrating in a single day or night, whence the once prevalent idea that they dived under the mud to pass the winter. The little black rail (*P. Jamaicensis*, Vieill.) is about 6 inches long, the smallest of the North American species of the family; the head and lower parts are slate-colored, nearly black on the top of the head; abdomen banded with white; upper parts brownish black with white stripes, and reddish chestnut on the upper back; the young are wholly bluish black. It is rare on the continent, but more abundant in the West Indies; it is highly prized by collectors. The yellow-breasted rail (*P. Noveboracensis*, Vieill.) is about 7 inches long and 13 in alar extent; the color is ochre yellow above, with brownish black and white stripes; neck and breast tinged with reddish, middle of abdomen white, sides banded with reddish brown and white; under tail coverts rufous, white-spotted, and under wing coverts white. This pretty bird, resembling a young chicken, is found, though not abundantly, in damp meadows in the eastern and southern states; it approaches in habit the corn crake and in some respects the European quail, and
was regarded by Audubon as one of th
necting links between land and water
the flesh is delicate.—In the genus *crex*
the bill is conical, shorter than the he
the whole appearance and habits are m
those of gallinaceous birds. The E
land rail or corn crake (*C. pratensis*,
is about 10 inches long; the genera
above is blackish brown, with lighter
but without white spots; grayish belo
lives and nestles in fields and meadows, r
with great rapidity; its cry resembles the
lables "crex, crex," causing a disagr
rattling in the throat, whence the name
derived from the French *râle*, accordi
Buffon. It is a solitary bird, remainin
cealed during the day, and seeking its
morning and evening; it is a northern
migrating to central Europe in spring a
turning in October; the French call it
of the quails" from its coming and goin
the same time with that bird; in sum
seems to be a constant visitor to Gre
and is occasionally seen on the E. coast
United States; it feeds principally on
insects, and worms.—The following gen
less known. *Aramides* (Puch.) has a
dozen species in the warmer parts of
America, inhabiting thick woods and per
at night; the notes of one species (*A.*
nensis, Gmel.) are so loud and clear that
may be heard for more than a mile; th
large bird, 18 inches long with a bill of
es; it feeds on small mammals, birds, fish,
insects, and fruits, and is useful about
by destroying rats and mice. *Eulab*
(Gould) is found in Australia and the M
cas; there are about half a dozen spe
Corethura (Reich.) has about 30 species in
parts of the globe.

RAILROAD, or RAILWAY, a road constr
of two parallel bars of iron, upon which
wheels of carriages run. Various devices
been employed from the time when whee
riages were first used for facilitating their m
ment over the ground. These have been, h
ever, mostly limited to the smoothing and h
ening of the road bed. The Egyptians lear
in moving the great stones for their pyram
from the quarries, the advantage of solid tr
ways, and the remains of such formed of blo
of stone are said to have been found on the
of the great roads they constructed for th
purpose. The ancient Romans made an ap
proach to the invention of railroads in the Ap
pian way, which was formed of blocks of sto
closely fitted together, their surface presen
a smooth and hard track for the wheels. In
modern times such tracks have been made in
several European cities, as Pisa, Milan, Lond
&c. The first instance of the use of rails ap
pears to have been some time previous to the
year 1676 at the collieries near Newcastle
upon-Tyne, England. At that time, as narrat
ed by Roger North in his life of Lord Keepe
North, the coals were conveyed from the mine

the banks of the river "by laying rails of timber exactly straight and parallel; and bulky carts were made with 4 rollers fitting these rails, whereby the carriage was made so easy that one horse would draw 4 or 5 chaldrons of coal." This great improvement was slowly appreciated, and its adoption was for a long time confined to the coal districts of Northumberland and Durham. Changes, however, were introduced in the construction of the track, and, according to a description of the road made about the year 1765, it had already assumed the principal features of railroads, even including the use of flanges upon the wheels, but not an iron surface for the wheels to roll upon. The following was the method of construction. The road being brought to as uniform an inclination as practicable, squared blocks of wood, called sleepers, about 6 feet long, were laid 2 or 3 feet apart across the track. Upon these two long strips of wood, 6 or 7 inches wide and 5 inches deep, were fastened by pegs parallel to each other and about 4 feet apart, and these lines were thus extended the full length of the road. The track was then filled in with gravel, ashes, or other road material. Wagons carrying 2 or 3 tons of coal were used to run on the track, their wheels provided with flanges which pressed against the edges of the rails, and prevented their slipping off. The structure was improved by securing a second set of rails upon the top of the first, thus increasing the facility of removing and replacing the wearing surface in any portion without affecting the remainder of the road. Even at this time straps of iron were nailed upon the rails to diminish the friction wherever the ascent was steep or sharp curves made the draught more difficult. The next improvement was introduced in 1767 at the iron works of Colebrook Dale, at a time when pig iron was very cheap, and the metal might advantageously be applied in the way of experiment to new uses. The proprietors made iron bars to take the place of the upper rail of the road, casting them 5 feet long, 4 inches wide, and 1¼ inches thick, with holes for the spikes by which they should be secured to the lower rail. Some time after this, about the year 1776, the iron rails were cast with a perpendicular ledge upon the outer edge, in order to keep the wheels from running off the track; and after a time the ledge was transferred to the inner side of the rail. These were called tram roads and plate roads, the former name being derived from a Mr. Outram, who was connected with the collieries. Tram is also the name of the wagons run on these roads. The success of this improvement led to its general introduction in mines, and for a long period the rails were made altogether of cast iron; but since the construction of the new machinery for rolling malleable iron, this has been in great measure substituted for it. The objection to tram roads is the liability of the rail to get obstructed with stones and dirt, and thus impede the progress and endanger the safety of the carriage. They moreover add unnecessarily to the weight of the rail. A great step in advance was made in 1789 by Jessop, who laid down at Loughborough cast iron "edge rails," of even surface at the top, the ledge being transferred round the edge of the wheel and forming a flange, which was kept above the ground by the elevation of the rail. The rails are said to have been set and bolted in cast iron chairs and on sleepers. The importance of these improvements, which comprised some of the essential features of modern roads, does not appear to have been immediately appreciated. Edge rails were again in use, however, in 1801 at the slate quarries of Lord Penrhyn, made of oval section with the longer diameter vertical. They were 4½ feet long, and each end terminated in a block of the shape of an inverted wedge, which fitted a cavity in an iron sill imbedded in the road. The tire of the wheel was hollowed out to fit the convex surface of the rail; but as the fit became too tight by wear, it was afterward found expedient to make the surface of the rail flat, and that of the wheel the same with a flange around each edge of it. So great an improvement was this, that it was found 10 horses could do the work that had employed 400 upon a common road. Edge rails were soon after introduced at the collieries in the north of England, and a new form was there adopted with the view of securing increased strength without proportional increase of weight. They were made thin, spreading in thickness at the top, and the under edge was curved, giving the greatest depth midway between the ends or points of support of the rail. This was known from its form as the "fish-bellied" rail, and long continued in use even after wrought iron rolled rails were substituted for those of cast iron. It was in 1808 that this improvement was introduced; but flat bars only could be used, and it was not until 1820 that machinery was constructed for rolling iron into suitable shapes for rails. The substitution was very important, as the cast iron rails could be made straight only 3 or 4 feet long, and consequently required frequent points of support, and the joints were numerous. The material moreover is brittle compared with wrought iron, and altogether unsuitable on this account for heavy loads and high speed. The motive power employed was almost exclusively that of horses. On inclined planes gravity was made use of for descending wagons, and these were sometimes made to draw up others by means of a rope passed around a wheel at the summit. —The possibility of constructing steam carriages had been suggested by Watt in the course of his early investigations of the properties and applications of steam; and in 1782 Oliver Evans of Philadelphia patented a steam wagon, the drawings and specifications of which were sent to England in 1787, and again in 1794-'5. A locomotive carriage was also patented in 1784 by Watt, and a non-condensing working model was constructed the same year by his assistant, Wm. Murdoch. In 1802 Richard Trevithick patented a high pressure locomotive engine, and in 1804 constructed one for the Merthyr Tydvil railway in S. Wales. Lightly loaded, it did very well upon a level surface or moderate grade; but more severely tasked, the wheels would slip round without advancing. A check was thus put upon their use until some method could be devised by which they might obtain a hold upon the track or otherwise push themselves forward. A rack laid along the side of the rail into which worked a toothed wheel fitted to the locomotive was tried in 1811 on a colliery line near Leeds, but the friction was too great, and it was abandoned. The next year engines were tried with 8 driving wheels for securing the required adhesion; and about the same time other engines were constructed with levers projecting behind and working alternately like the hind legs of a horse. In 1814 and 1815 engines with plain wheels were found to work successfully on some of the northern roads; but no other application was made of them than for transporting the coal and ore wagons of the mines. The first railroad opened for conveying passengers was the Stockton and Darlington road in 1825, and this was worked with horse power. The French engineer, M. Seguin, in 1826 successfully introduced locomotives upon the railways from Roanne to St. Étienne, and from St. Étienne to Lyons, and to Andrezieux; and in these he first constructed small tubes passing from the fire box to the chimney, an arrangement of the greatest importance for increasing the evaporative power of the engine, and which was adopted by Messrs. Stephenson and Booth in their engines. He also increased the draught of the fire by means of a ventilator, an effect which Robert Stephenson better accomplished in 1829 by the action of the steam. The Liverpool and Manchester road was commenced in 1825, and it was the intention of its projectors to run the carriages upon it at high rates of speed. To do this with horses was expensive, and to work it by steam power it was supposed that stationary engines would be required at short intervals along the road to draw the trains by ropes from one station to another. A premium of £500 was offered for the best engine—one that should not produce smoke, should draw 3 times its own weight at the rate of 10 miles an hour, should be supported upon springs, should not weigh more than 6 tons, or 4½ tons if it ran on 4 wheels only, and should not cost more than £550. In Oct. 1829, 4 locomotives were presented for trial, and the prize was awarded to the Rocket, weighing 4 tons 5 cwt., built by Messrs. Robert Stephenson and Booth, which ran at an average speed of 14 miles an hour, with a gross load of 17 tons, and under certain circumstances doubled this speed. The next year steam carriages were in regular operation upon this road. Thus was established a new system of locomotion, vastly exceeding in capacity all others before known, destined to be rapidly extended, and to exert an extraordinary and most beneficial influence upon human affairs. The [illegible] engine that determined the question of its use soon gave place to more powerful machines, till some of those employed upon the English roads have attained a weight exceeding [illegible] tons; on the great western line are some [illegible] tons, and on the Sœmering line of 48 tons, having 6 coupled wheels. The road upon which this great result was accomplished was laid with wrought iron rails of the "fish belly" form. Several of the curves or spans were included in each rail, and they were stiffened by projecting ledges or rims on the under side. Their weight was 33 lbs. to the yard; and they were supported in cast iron chairs, which were spiked down to square stone blocks between the spans, or at every three feet. The gauge or distance apart of the two rails was 4 feet [illegible] inches, which, having been afterward generally adopted in England, is considered as the national gauge. New roads were immediately projected in England, chiefly in the northern part, connecting together its principal cities, or adding to the numbers already constructed in the mining counties. The capacity of the locomotive was not however yet appreciated, and upon most of the roads it was considered necessary to build inclined planes for overcoming the ascents, and upon these employ stationary engines to draw the trains to the summit. Upon these and upon tunnels, both designed to reduce curvatures to the least possible amount, and also the grades upon the running portions of the roads, money was most freely expended; and as a measure of safety the more important roads were from the first built with double tracks.—The advantages secured by these improvements were too important to be overlooked in the United States. Before the application of steam to railroad purposes was established, a horse railroad was partially built in 1826 and completed in 1827, from the granite quarries of Quincy, Mass., a distance of 3 m. to the Neponset river. This terminated at the quarries with a self-acting inclined plane. The road was built upon granite sleepers 7½ feet long, laid 8 feet apart. The rails, 5 feet apart, were of pine, a foot deep, covered with an oak plate, and this with flat bars of iron. The second road was laid out in Jan. 1827, and was completed in May of the same year, from the coal mines of Mauch Chunk, Penn. to the Lehigh river, a distance of 9 m., and with the turn-outs and branches the whole length exceeded 13 m. From the summit within half a mile of the mines the descent to the river was 982 feet, of which 225 were included in a self-acting plane at the river, and 25 feet more in a shute by which the coal was discharged into the boats. The remainder was in a continual descending grade, down which the loaded wagons ran by gravity, one of them being appropriated to the mules by which the empty wagons were drawn back. The rails were of timber laid on wooden sleepers and strapped with flat iron. In other states at this time an extraordinary activity began to be aroused and measures set on foot to introduce the improved means of conveyance and transportation of freight upon the principal lines of communication. Charters were obtained in Massachusetts, New York, New Jersey, Pennsylvania, Maryland, South Carolina, and other states for numerous roads, some of which were designed upon a grand system, favored by the peculiar features of the country and the success which had attended the Erie canal and other works of internal improvement. The Delaware and Hudson canal company in 1828 constructed a railroad from their coal mines to Honesdale, the terminus of the canal; and had already commissioned Mr. Horatio Allen, who had gone in the autumn of 1827 to England for the purpose of investigating the railroads of that country, to purchase their railroad iron and 3 locomotives. One of the engines, built by George Stephenson at his works at Newcastle-upon-Tyne, arrived in New York in the spring of 1829, and was to be seen for some time in the yard of E. Dunscomb in Water street, its wheels raised above the ground and kept running for the gratification of those interested. Another engine, built by Foster, Rastrick, and Co., of Stourbridge, arrived soon after, and was put on the road the latter part of the summer of 1829. This was the first use of a locomotive in this country. It was an engine on 4 wheels, furnished with the multitubular boiler and the exhaust blast. In South Carolina operations were commenced in 1829 upon the road designed to connect Charleston with Hamburg on the Savannah river; and 6 m. were completed from Charleston in that year. It is a noteworthy fact that before the use of locomotives was established in Great Britain, or they were known in the United States, the directors of this road determined, under the advice of their engineer, Mr. Horatio Allen, as given in his communication to the board in November, 1829, to make them exclusively the motive power, and the road was constructed in such a manner as to be wholly dependent upon them, being built upon piles, often at a great height above the ground. The company offered a premium of $500 for the best plan of horse locomotive, and this was awarded to Mr. C. E. Detmold, afterward of New York, who constructed one with the horse working on an endless chain platform. It carried 12 passengers at the rate of 12 m. an hour. The same gentleman, in the winter of 1829-'30, made the drawings of the first American steam locomotive, called the "Best Friend," which was planned by Mr. E. L. Miller, then residing in Charleston, made by the Kembles at their shop in West street, New York, and placed on the road late in the summer of 1830. It was a small 4-wheeled engine with upright boiler and water flues close at bottom, and the flame circulating around them. It worked successfully for about two years, when it exploded, and was rebuilt with a flue boiler. Upon this road, in 1831, was first introduced on any railroad either abroad or in the United States the important arrangement of two 4-wheeled trucks for locomotives and long passenger cars. These were built from plans designed by Mr. Horatio Allen in 1830; and with no essential change his system of double truck running gear, including the application of pedestals to the springs, has ever since been adopted upon all the roads of the country.—Of the great railroad enterprises, one of the principal was the Baltimore and Ohio road, of which the first stone was laid on July 4, 1828, and which was gradually extended from the city of Baltimore across the Patapsco, and up this stream to Ellicott's Mills, 13 m. from Baltimore. It was thence projected to the Potomac at the Point of Rocks, 67 m. from the city, on the line of the Potomac valley, to the coal region of Maryland and to the Ohio river. The road was originally planned for horse cars only; but the successful introduction of steam locomotives in England encouraged the attempt to run them here, and in 1829 a small locomotive, built in Baltimore by Mr. Peter Cooper, was put upon the road, and by this and also by horses trains were regularly run in that year to Ellicott's Mills. From Jan. 1 to Sept. 1, 1831, the number of passengers transported was 81,905, beside 5,931 tons of freight. The road was constructed of longitudinal rails pinned down to the wooden or stone cross ties, which were imbedded in the ground, and upon the rails were fastened flat bars of iron ½ and ⅝ inch thick and 2½ to 4½ inches wide by spikes, their heads countersunk in the iron. This method, which was generally adopted upon the early American roads from considerations of economy, and with the view of extending the lines to the utmost limit of the capital provided, was soon found to involve great danger and consequent expense. The ends of the rails became loose, and starting up were occasionally caught by the wheels and thrust up through the bottom of the cars. It was found necessary to run the trains with great caution upon the roads thus constructed, and the passenger traffic was seriously diverted from those lines that had acquired a notoriety for "snake heads." In Aug. 1830, the Hudson and Mohawk railroad, from Albany to Schenectady, N. Y., 16 m., was commenced, a charter for which had been granted in 1826. In Oct. 1831, the number of passengers upon it was stated to be 387 a day, and in 1832 a locomotive with a load of 8 tons travelled on it at the rate of 30 m. an hour. Several other railroad enterprises were undertaken in the Pennsylvania coal region in 1830, and in the session of the legislature of 1830-'31 no fewer than 12 railroad companies were incorporated. In 1830 operations were commenced upon the Baltimore and Susquehanna railroad. In 1831 a road was completed on the S. side of the James river in Virginia, from Manchester, opposite Richmond, 13 m. up the river to the coal mines; and on April 16 of the same year the Lake Pontchartrain road in Louisiana, 4½ m. long from the lake to New Orleans, was opened. From this time these enterprises were multiplied with great rapidity. In Pennsylvania, it is stated, 67 railroads were in operation in 1832; and in that year were commenced the most important lines of Massachusetts and New Jersey. In a very short time the roads outstripped in length those of Great Britain, and have ever since far exceeded in numbers and extent those of other countries. They have however been planned and constructed in great measure independently of each other, without regard to any great system; and as the charters are granted by each state for the roads in its own territory, a single state has sometimes, by refusing to authorize the construction of a proposed road, succeeded in preventing the establishment of an important line, the opening of which, it was supposed, might injuriously affect the whole or a favored part of such state. This want of system is perceived and its evils are experienced in the various gauges adopted by different roads, rendering necessary frequent transshipment of passengers and freight. The early roads using English locomotives were constructed for a gauge of 4 feet 8½ inches, that being the chance width of the old tram roads of the north of England, and retained upon the newer roads. In the United States independent gauges were afterward introduced, as of 4 feet 10 inches in New Jersey and Ohio; 5 feet, which is the gauge of the Virginia and Tennessee road and other southern roads; 5 feet 4 inches, that of two roads in Ohio; 5½ feet, that of the Atlantic and St. Lawrence road, Maine, also established by law in Missouri, and afterward in Canada; and 6 feet, which is that of the New York and Erie road. In order that the business of the last of these roads might be brought to New York city through New Jersey on the line of the Paterson road, it was found necessary to add a third rail to the narrow track for the special accommodation of the Erie trains. Notwithstanding the original want of system, several important continuous lines have been developed, in part by bringing together detached and independent roads, and in part by the construction of long roads looking specially to this end. The first great lines were established to secure to the cities on the seaboard from which they emanated a larger share of the business from the western states. The advantage secured to Boston by the opening of the western road terminating at Albany, and taking thence into Massachusetts at all seasons, and especially in the winter when the Hudson river was closed, produce brought by canal and by the New York central roads from Buffalo, compelled New York to open a route direct from the city to Lake Erie; and the Erie road, commenced in 1833, was pushed forward to its completion, which however was not reached until 1851. The Housatonic road, though perhaps not built specially on this account, also benefited New York in winter, particularly in this competition with Boston. But before these enterprises were completed the latter city had furnished the means for opening the Michigan central, and extending it from Detroit to Chicago, that the products of the West might more readily reach Albany; and it was also sending out its arms toward the N. W., reaching the outlet of the great lakes at Ogdensburg, before this was connected by railroad with the metropolis of its own state. These enterprises stimulated Pennsylvania to perfect her line of communication between Philadelphia and Pittsburg, which from Harrisburg to Hollidaysburg was by canal, and thence over the Allegheny mountains by a succession of 5 inclined planes and intervening levels up the mountain on one side, then by a long level to the 5 inclined planes and levels which terminated below at Johnstown, where another canal took the boats that had been brought over the mountain in sections, and conveyed them to Pittsburg. The canals and inclined planes were done away with, and a continuous road was opened across the state. This has been made to connect at Cleveland on Lake Erie, with Chicago, and through Columbus and Cincinnati with the system of roads of Indiana and Illinois. Baltimore, feeling the effects of these advances, was impelled to push forward the Baltimore and Ohio road, which had long stopped in the Cumberland coal region, and it was at length completed to Wheeling on the Ohio. Charleston and Savannah early appreciated the importance of connecting their harbors with the productive districts of the interior by railroads; and when these had penetrated their own states, the line of equal importance to both was extended through N. Georgia into Tennessee, connecting in 1849 Chattanooga with those cities. All these advances into the valleys of the branches of the Mississippi affected the cities of the gulf of Mexico, and Mobile and New Orleans hastened forward the lines which in the early history of American railroads they had projected for securing to themselves the trade of these valleys. From Mobile a road directed toward the mouth of the Ohio has been completed into N. Mississippi; and from New Orleans, through the central part of Mississippi and across W. Tennessee and Kentucky, the Ohio river has been reached at Paducah, a few miles above its mouth. Virginia, seeking the trade of the same region, has also reached E. Tennessee by the roads from Richmond through Lynchburg to Knoxville and Chattanooga, whence the western line already completed to Memphis on the Mississippi crosses the Mississippi railroad at Grand Junction on the southern line of Tennessee, and with this makes the communication complete from Alexandria, Norfolk, and Richmond to New Orleans. The connection between the cities of the Atlantic coast, with the exception of the short break between Washington and Alexandria, is complete by independent roads, planned originally from one city to the next; and from Philadelphia to Portland, Me., by numerous parallel routes. In the N. W. states railroad enterprise has been developed to an extent hardly surpassed in the most populous districts of New England, the construction of roads being there greatly facilitated by donations of land by the government. The longest of these lines is the Illinois central railroad, extending from Cairo at the mouth of the Ohio to Dunleith on the Mississippi river in the extreme N. W. corner of the state, a distance of 455 m., with a branch of 253 m. from Centralia to Chicago. On both sides of this road and its branch the company was endowed with alternate sections of land, of the total width of 6 sections or miles and length of 706 m. Where the lands were already taken up, the company was privileged to select any others within 15 m. of the line of the road. It thus acquired 2,595,000 acres in an excellent farming region, and from the sale of them the expenses of construction, amounting to $23,427,669, are met. In this state, where in 1850 there were only 22 m. of railroad, in 1856 there were 2,750 m. In Wisconsin three ports on Lake Michigan are connected by as many lines of roads with the Mississippi river, the most northern reaching it at La Crosse near lat. 44° N., whence it is to be continued to St. Paul and the falls of St. Anthony. In Iowa several lines are directed W. from the Mississippi, destined to reach the Missouri river, and in N. Missouri the Hannibal and St. Joseph, 206 m. long, and the N. Missouri railroad from St. Louis to St. Joseph, 304 m. long, already make this connection. S. of the Missouri river, what is called the Pacific railroad is completed from St. Louis to Syracuse, Mo., 168 m. In the wonderful progress of railroads throughout the country, the great and unsurpassed natural means of communication between the interior and the seaboard have been found wholly incompetent to meet the increasing demands of the people for the most unobstructed and rapid means of transportation. Railroads are built along the banks of navigable rivers and the great lakes, and from the current of the Mississippi draw away to the distant shores of New England and of the middle states the products that should naturally follow the river to the sea. The most important natural routes of the N. E., where they lie on a direct course, as the two lower lakes and the St. Lawrence river, are bordered on both sides with lines of railroads that extend from the head of Lake Erie to Quebec; and where the inland seas present circuitous routes, as from Lake Ontario to Georgian bay and Lake Huron, and from Lakes Erie and St. Clair to Lake Michigan, these are cut off by various direct railroads across the peninsulas. —The progress of the railroads of the United States in periods of 2 years each, from the year 1838, when the number of miles completed amounted to 1,843, to the close of the year 1860, is represented in the following table, which also designates the lengths of road in each state for the same years:*

States.	1838.	1840.	1842.	1844.	1846.	1848.	1850.	1852.	1854.	1856.	1858.	1860.
Maine	12	12	27	61	64	113	257	349	396	482	492	474
New Hampshire	..	..	..	9	19	290	471	509	546	669	669	679
Vermont	..	..	..	..	..	92	366	429	454	471	553	530
Massachusetts	126	144	425	465	606	980	1,042	1,145	1,259	1,285	1,280	1,314
Rhode Island	50	50	50	50	50	61	68	40	55	50	50	101
Connecticut	96	96	228	229	299	270	470	570	488	601	601	602
New York	215	474	550	729	872	1,010	1,414	2,180	2,652	2,701	2,301	2,690
New Jersey	140	140	186	186	186	250	303	299	429	479	413	555
Pennsylvania	588	563	593	630	695	661	961	1,219	1,531	2,041	2,943	2,743
Delaware	16	16	16	16	16	16	16	16	56	93	96	127
Maryland	151	151	255	258	265	274	374	532	565	673	576	489
Virginia	125	125	223	223	230	400	368	548	956	1,270	1,474	1,590
North Carolina	..	50	87	87	87	155	249	249	348	583	770	697
South Carolina	137	137	204	204	204	204	270	380	656	708	781	735
Georgia	52	185	220	452	576	662	654	857	875	1,090	1,274	1,401
Florida	..	..	..	..	..	23	23	23	23	81	151	635
Alabama	46	46	46	46	46	111	112	183	280	402	610	642
Mississippi	..	..	..	..	..	50	95	50	210	410	410	729
Louisiana	46	46	46	46	46	55	69	117	190	257	228	290
Texas	..	..	..	..	..	..	..	..	82	71	147	284
Arkansas	..	..	..	..	..	..	..	..	..	..	85	38
Missouri	..	..	..	..	..	..	..	37	37	245	507	815
Tennessee	..	..	..	..	..	..	..	135	226	590	986	1,230
Kentucky	22	22	28	28	28	28	77	88	251	350	476	581
Ohio	..	..	84	84	84	274	590	1,419	2,125	2,580	2,650	3,097
Michigan	..	..	159	209	220	394	327	427	474	618	686	797
Indiana	..	..	..	..	30	86	288	350	1,395	1,697	1,995	2,059
Illinois	..	..	22	22	22	22	110	290	1,224	2,571	2,851	3,062
Wisconsin	..	..	..	..	..	..	20	20	186	570	775	867
Iowa	..	..	..	..	..	..	..	..	..	346	346	649
California	..	..	..	..	..	..	..	..	..	23	22	70
Total	1,843	2,167	[illegible]	[illegible]	[illegible]	4,491	6,927	12,938	19,136	22,734	27,550	31,185

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* It is impossible to obtain correct statements of each year, as most of the roads run into different states, and the distinction is not always made of the number of miles belonging to each state. There is also confusion in the published statistics between the number of miles in actual operation at any time and of those under construction. The last column of figures is taken from the "American Railroad Journal," and was prepared with special care to avoid these sources of error. In the other columns it has been found necessary to change the returned figures occasionally, that the number of miles in operation in any year might not exceed those in operation at the next period of two years. This has been done sometimes by making the figures agree with the succeeding and sometimes with the preceding period of two years. Such changes are too few and unimportant to affect the general value of the table.

The total length of roads projected and constructed in the several divisions of the United States, and cost of the same up to Jan. 1, 1[illegible] are given in the following table:

States.	Total length of line.	Miles in operation.	Cost of roads and equipments.
North-eastern states.			
Maine	689.86	475.86	$16,288,261
New Hampshire	684.29	657.88	22,676,284
Vermont	555.87	555.87	28,240,097
Massachusetts	1,886.68	1,814.85	59,777,878
Rhode Island	186.82	104.82	4,188,888
Connecticut	762.90	607.76	20,948,880
Total	4,165.87	8,785.54	$147,014,288
Middle Atlantic states.			
New York	8,455.87	2,808.96	$145,259,792
New Jersey	844.76	627.28	80,895,081
Pennsylvania	8,972.26	2,948.22	151,529,629
Delaware	170.69	186.69	4,870,766
Maryland and District of Columbia	701.81	405.81	19,979,284
Total	9,144.89	6,921.96	$851,584,502
South Atlantic states.			
Virginia	2,488.62	1,805.04	$69,580,696
North Carolina	1,212.04	886.92	17,084,500
South Carolina	1,074.47	978.47	22,045,485
Georgia	1,724.20	1,401.50	27,632,690
Florida	786.50	826.50	6,561,000
Total	7,230.83	5,898.48	$142,904,821
Gulf states.			
Alabama	1,488.90	648.40	[illegible]
Mississippi	870.80	797.80	[illegible]
Louisiana	881.00	827.75	[illegible]
Texas	2,667.00	294.50	[illegible]
Total	5,807.70	2,068.45	[illegible]
South interior states.			
Arkansas	701.88	88.50	[illegible]
Missouri	1,480.60	813.10	[illegible]
Tennessee	1,412.63	1,268.54	[illegible]
Kentucky	763.90	581.20	[illegible]
Total	4,808.46	2,666.84	[illegible]
North interior states and California.			
Ohio	4,183.25	8,057.08	[illegible]
Michigan	1,412.10	807.80	[illegible]
Indiana	2,522.27	2,056.17	[illegible]
Illinois	8,551.90	2,924.60	[illegible]
Wisconsin	2,272.09	937.09	[illegible]
Iowa	2,021.60	546.80	[illegible]
Minnesota	1,167.00	....	[illegible]
Total	17,080.41	10,882.99	[illegible]
California	843.23	70.05	[illegible]
Total United States, January, 1861	48,100.89	81,168.76	[illegible]
Total United States, January, 1859	....	27,857.00	[illegible]

The comparative statement of the extent and various conditions as to cost and profits of the roads of the principal countries of Europe, of the United States, and of India for the [illegible] named, is presented in the following [illegible] given by English authorities:

Countries.	Years.	Length of line open, miles.	Total capital expended per mile of line open.	Receipts from traffic per mile of line open.	Net receipts per mile of line open.	Proportion per cent. of working expenses to receipts.	[illegible]
Austria	1856	1,586	£16,878	£2,190	£1,040	52.70	[illegible]
Belgium	1856	445	16,891	2,158	898	58.16	[illegible]
France	1854	2,918	25,668	2,706	1,515	44.01	[illegible]
Germany, exclusive of Austria and Prussia	1855	2,226	18,111	1,816	919	49.28	[illegible]
Great Britain—England and Wales	1857	6,706	89,275	8,161	1,597	48.00	[illegible]
Scotland		1,248	28,225	2,107	1,166	44.00	[illegible]
Ireland		1,070	15,664	1,091	626	88.00	[illegible]
Holland	1857	168	19,981	1,709	667	60.96	[illegible]
Prussia	1856	2,508	14,101	1,877	909	51.59	[illegible]
Sardinia	1855	284	....	1,477	708	51.88	....
Spain	1855	180	....	924	409	56.48	....
Switzerland	1856	203	19,888	686	295	54.28	[illegible]
Tuscany	1856	182	15,556	966	520	46.18	[illegible]
United States of America	1855	17,481	8,275	1,284	568	54.00	[illegible]
East Indian	1858–'9	142	12,084	1,447	770	45.04	[illegible]
Great Indian Peninsula	1858–'9	194	8,758	764	427	44.10	[illegible]
Madras	1858–'9	96	7,000	499	234	58.90	[illegible]

The total number of miles of railway open for traffic in Great Britain in 1859, according to the report of the department of railways, was:

In England and Wales	7.217 miles;	receipts,	£9,989.959	17s.	6d.
In Scotland	1,369	"	1.267,792	8	9
In Ireland	1,210	"	604,957	9	8
Total	9,796	"	£11,862,789	10s.	11d.

—Although, before deciding upon the construction of a railroad, the first requisite would seem to be a careful computation of the amount of business already done upon the route in the transportation of passengers and freight, with the view of determining whether this would justify the proposed expenditure, estimates of this character have been found by experience to afford a very uncertain index as to the actual business that would result under the new circumstances. A more enlarged view of the conditions of the country through which the road is to pass is consequently necessary, and a careful consideration of the effects already experienced from the opening of new roads in other similar regions. New branches of trade may be stimulated by the greater economy of transportation offered by the new road, inducing an increase of population and of the travel of passengers, and these as well as freight may moreover be drawn in from other channels of travel. The construction of most of the roads of New England, and to a less striking extent of roads in other parts of the United States, has developed in a wonderful manner what has been called the travelling propensities of the people. This is shown by the following examples, the first column of figures (*a*) representing the estimated number of passengers before the road was built; the second (*b*), the number soon after; and the third (*c*), the number in the year 1848:

Name of road.	*a*	*b*	*c*
Boston and Worcester....	[illegible]	[illegible]	[illegible]
Boston and Lowell......	[illegible]	[illegible]	[illegible]
Fitchburg...............	71,790	[illegible]	[illegible]
Western.................	251,760	[illegible]	1,091,169
Boston and Maine........	....	462,426	[illegible]

A similar increase has been experienced also upon most of the roads in the amount of freight transported. But as railroads have been multiplied and an active competition has grown up among them, such results can now rarely be counted on in short periods. Another consideration, which experience has shown to be a very important one, and which now often induces the construction of railroads, is the influence which these are likely to have upon the value of real estate along their line, and even in the cities where they terminate. Again, as the prosperity of one city is found to advance rapidly from the effect of its railroads, property holders in others, which are injuriously affected by the diversion of trade, are compelled to open similar avenues for their own protection. Thus it has been in the United States that many of the roads have been projected, not with reference to direct remuneration by the business done upon them, but to indirect returns, in which many who ignorantly subscribe to the stock can have no immediate interest.—Preparatory to the location of a railroad, surveys are made along the several routes the road may follow, and plans are constructed representing the exact distances and grades or the amount of deviation from a level at all the points. From these plans are calculated the amount of excavation and embankment, of tunnelling, bridging, &c., necessary to bring the road within the required degree of straightness and level. Thus the estimates are obtained, by comparison of which, including with each also the ascertained amount to be paid for right of way, the location of the road is determined. The importance of the road and the special purpose for which it is designed, as for transportation chiefly in one direction only, or in both, whether it is to be run at moderate or high rates of speed, &c., are to be duly considered in deciding upon saving of distance and reduction of grades by heavier expenditures. Roads upon which numerous trains are to pass daily, each one of which will incur a certain additional expense for every additional mile, and each mile will involve a certain annual expense for keeping in repair, may economically be shortened at increased outlays that would be entirely inadmissible in securing a similar reduction of distance to less travelled routes. So upon roads that are to be run at high rates of speed short curves must be avoided at any expense. It has happened, from the experience gained in the working of railroads, that some of the earlier lines have been economically reconstructed by a partial abandonment of the old routes under more judicious surveys, or from the increase in the business justifying the adoption of a more perfect line. As already remarked, the old system of occasional inclined planes is almost wholly abandoned for roads of general travel, and the construction and capacity of locomotives and carriages is so much better understood, that a much greater range in curvatures and grades is now found practicable than was formerly ever thought of. As regards curves, it was formerly recommended in England to fix the minimum radius that should be allowed at one mile, and in 1846 it was one of the "standing orders" of parliament that no curve could be made less than with a radius of half a mile (2,640 feet) without special permission of parliament. In France a minimum was established by "the administration of roads and bridges" of 2,700 feet, or about 2°. On the Hudson river railroad the minimum curve has a radius of 2,062 feet = 2.75°. But the Baltimore and Ohio road was built with several curves of 400 feet radius (14.25°), and with one of 318 feet (18°), and no difficulty was experienced in running over them at 15 m. an hour. The objectionable features of the curves are avoided by making the wheels conical, of greater diameter within than at their outer edge; the effect of this in running on a curve, when the wheels on the outer side are pushed by the centrifugal force outwardly, is to make them roll on their larger diameter, and at the same time the wheels on the other side, drawn in toward the centre of the track, roll on their smaller diameter. On each side they are thus accommodated to the different lengths they have to traverse, without straining the axles and without greatly increased friction or slipping of the inner wheel upon the rail. The friction against the outer rail due to the centrifugal force is partially prevented by elevating the outer rail. The object of attaching the wheels to their axles instead of letting them turn upon these, is to secure greater steadiness at high speed. The requiring of minimum degrees of curvature has been abandoned upon the English and French roads, and occasional instances are now noted of very short curves, as of 300 feet radius on the Woolwich line near London, and of 529 feet on the great western, great northern, and Newcastle and Carlisle lines. In France, upon the Paris and Orsay and Paris and Sceaux railroads, there are curves of 52 feet radius, and trains, the engines and carriages of which are provided with loose wheels and guide rollers, run through complete semicircles at 20 m. an hour.—Upon the earlier roads in Great Britain and in the United States grades of 30 or 40 feet to the mile were considered heavy, at the last figure nearly tripling the power that was required to draw a load upon a level. Grades of 70 to 80 feet were regarded as almost impracticable, as they would compel the carrying of light loads over the whole line; and therefore, when such grades could not be otherwise avoided, inclined planes worked by stationary engines were adopted. The Hudson and Mohawk railroad, in a length of 16 m., was built with one such plane at Albany, and another at Schenectady. The Philadelphia and Columbia railroad was also built with two planes, one at Columbia and the other near Philadelphia, and there were 10 on the Alleghany portage road over the Alleghany mountains, all of which have been displaced by the substitution of heavier grades on more extended lines. But as experience was acquired in the working of railroads, it was found that locomotives rarely carried maximum loads for the moderate grades, and that a temporary slackening of the speed upon the steep grades rendered a further portion of the power of the locomotive available for overcoming the increased resistance. Thus, when the doubtful point as to the adhesion of the driving wheels to the rails was satisfactorily determined, and the common law of mechanics, that power can be gained at the expense of time, was found to be applicable to ascending grades of a railroad, these were increased much beyond their former limits. High grades were sooner introduced in this country than in Europe, but they have recently been adopted there also. On the Mount Savage and George's creek railroads in Maryland grades of 140 feet to the mile have long been used; and on the Baltimore and Ohio road, through the Alleghany mountains, of 114 feet. In England those of 100 feet to the mile are not uncommon, and there are several from 180 to 150 feet. At Sheffield is a grade of 196 feet to the mile, and the same is seen at Oldham on the Lancashire and Yorkshire road, extending for 1¼ m. In France on the St. Germain railroad is a grade of 123 feet to the mile for about 1¼ m.—In the construction of railroads the proper preparation of the road bed should be an object of the most particular care. Being the foundation and support of the whole superstructure, it should as a matter of economy be made as firm and durable as possible. But it is in this that the American roads are most defective. The least width of embankments for double tracks (and roads of importance should always be laid out for these) ought not to be less than the width of the two tracks, with 6 feet between them, and 6 feet outside of each. In excavations the width of ditches on each side should be added. A common width of embankments in England is 33 feet, while on the principal American roads it is about 27 feet. The transverse slopes of the English roads are much flatter than ours, and are commonly well protected with a good grass sod. But the most essential difference is in the drainage, upon which more than any thing else depends the durability of the earthwork and of the sleepers and rails. Upon some American roads the sleepers are laid directly upon the natural soil, or upon this thrown up in a bank. Where the ground freezes, any superstructure on such a basis is certain to be more or less displaced in the spring thaws; in wet weather it must prove very insecure, and in dry weather very dusty. The sleepers soon settle irregularly, placing the rails out of line, and thus are involved rapid wear, deterioration, accidents, and loss to the rolling stock and to the road. The dust rises in clouds, to the great injury of the machinery and of the passenger cars, and seriously incommoding the passengers themselves. The effects of water about the earthwork of railroads are regarded as so injurious that an eminent English authority says: "Wherever it is known or suspected to exist, its immediate source should be traced, and every possible means adopted for diverting it from the slopes and adjacent surfaces." Not only are capacious and permanent culverts, ditches, and drains abundantly provided, but sub-drainage by tile drains is also employed to great advantage; and as a final precaution the road bed is ballasted, usually a foot deep beneath the sleepers and another foot around and over them, and for a width on double tracks of 26 feet, the quantity per mile amounting to 10,000 or 12,000 cubic feet. The material preferred for ballast is gravel containing a natural mixture of clean sand, and next to this broken stone in pieces not exceeding 2½ inches in diameter. Limestone is not so good as gneiss, as it packs too densely, and trap rock also is likely to become too solid and rigid. A certain elasticity in the bed is essential for the durability of the rails; and where no other suitable material is at hand, common clay burned in lumps in great heaps intermixed with bituminous coal has been found to answer very well, especially if hard-burned. Cinders and small coal are excellent materials, and in Holland shells and broken bricks are extensively used. The French double track roads, from the reports of 1857, expended 115,000 francs per kilometre (equal to $6,039 per mile) for ballast, or 17 per cent. of the whole cost of "way." The road bed through the long English tunnels, and also upon the viaducts, is well ballasted, and the wear of the rails is thereby materially decreased. The wooden sleepers on the European roads are also very commonly protected by some chemical application. (See PRESERVATION OF WOOD.*) The ordinary duration of sleepers upon American roads is hardly 7 years, but upon English roads it is 15 years and upward. By the scrupulous attention directed to these details in building the European roads a great saving is effected in the cost of "maintenance of way," engines, and working. From the report of Messrs. Colburn and Holley ("Per-

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[*] A method of preserving the sleepers, not mentioned in that article, and practised on the Reading railroad, is as follows. The sleepers, stripped of their bark and notched by machinery to insure a smooth bearing for the rail, are exposed for 48 hours in ovens to as high heat as they will bear without ignition, the smoke and gases from the fire being passed directly among them. They are taken out hot and their ends immediately dipped in hot coal tar. Each sleeper absorbs about ¼ of a gallon of the tar; and the cost for each one is from 5 to 6 cents. Only hard wood sleepers, chiefly oak, are used.

manent Way," New York, 1858) it appears that these items on English lines average less than one half the amount of similar expenses on the railroads of New York and Massachusetts. Only one half as much fuel is consumed to the mile run on the English and French roads as on those of the northern United States; and the consumption of fuel may be taken as a measure of the resistances overcome. If the English trains are from 20 to 30 per cent. lighter than those of American lines, they are run 25 per cent. faster, thus requiring about the same power. The cost per mile of maintenance of way on the London and north-western railway in 1855 is said to have been only one fourth as much as on the New York central. If the proportion had been one half, the saving to the latter road would have been $418,281. Proper original construction as regards earthwork, drainage, and ballast, would without doubt have effected this saving.—The superstructure of railroads is almost universally upon transverse wooden sleepers, the primary object of which is to give a steady bearing upon the road bed. Seasoned white oak is preferable to any other wood for strength and for holding the spikes. Hemlock is better than chestnut, and both these are extensively used in the United States. Their dimensions are commonly 8 feet long and 7, 8, or 9 inches width of bearing surface, and their distance apart from centre to centre is from 2 feet 1½ inches, as on the Erie road, to 2 feet 6 inches. Upon the English roads they are commonly 9 feet long, 10 inches wide, often squared, and 5 inches thick. They are usually laid 3 feet apart from centre to centre; and that a uniform bearing may be secured, particular care is taken that the sleepers are alike in size and regularly spaced in their beds. In France the experiment has been tried of cutting the sleepers in two in the middle, leaving one in every 10 or 12 feet to bind the two rails together. The result was very satisfactory, the object being to prevent the spring of the full-length sleepers or the movement they sometimes acquire on their centre. But for these and detached rectangular blocks of any material either transverse or longitudinal, it is essential that the supports should be well packed upon a thoroughly ballasted road bed. In England, where wood is expensive and iron comparatively cheap, rectangular blocks of cast iron have been tried upon some of the roads, and with good results; but the conditions of cost are altogether unfavorable to their adoption in the United States. Granite sleepers have been tried and have continued in use upon one of the tracks of the Boston and Lowell road. They make a very hard and rigid support, and cannot be used in connection with wooden sleepers interspersed or alternating with them, unevenness in the track soon resulting. The smooth face of a rock ledge has been tried upon the Manchester and Leeds road, the rails being spiked directly down upon it. It was soon found necessary to take them up on account of the excessive wear upon the rails thus placed. The great western road in England is constructed with longitudinal bearings or sills measuring 10 inches square, and framed together by cross ties of 6 by 4 inches every 6 feet. The arrangement is said to be easy on the rolling stock, but as regards cost of maintenance of way this is one of the most expensive roads in England.—The rails, which are straight bars of wrought iron, differ greatly in the shape of their cross section, their weight, quality, and the manner in which they are secured to the road bed. Almost the first form was the fish-bellied rail, made about the year 1820. This soon gave place to others of more economical shape, as the T and the I rails, and to these was added the bridge or hollow rail, the form of which is nearly that of the letter U inverted. These have been variously modified in their figures and proportions, and a great number of other forms that may not be referred to either of these have been introduced upon different roads. In the United States an inverted T rail has been in very general use, so as to be known as the American rail. It has a broad bearing foot, and is easily secured to the sleepers by hook-headed spikes driven into elongated slots in the edge of the flange, or merely over the edge, thus allowing expansion and contraction of the rail with changing temperatures without disturbing the fastenings. With this rail cast iron chairs, employed for seating and holding almost all other rails, are not required except at the joints, and the additional cost of the iron, which is an important consideration on American roads, is saved. A favorite rail in England is the I or double-headed rail, which has the advantage of furnishing two sides for wear, being easily taken out of its chairs and turned over when one side is worn out. Professor Barlow's modification of this is also much used, the foot of which is much smaller than the head. The saddle-back rail of the same inventor has a split foot its whole length, the parts spreading like a saddle. It was designed to be imbedded in the ballast without sleepers, and with occasional ties of iron rods, connecting the two rails. About 900 m. of track were laid with this rail in 1858, but it did not prove altogether satisfactory, and cross sleepers were found to be essential for its stability. It is remarkable that in the long lengths of 5 or 6 m. in which the rails were firmly riveted together no accumulated motion by expansion and contraction has been observed. Compound rails, patented in England in 1847, have not been adopted there. A form is in use in this country, in which the portion of the rail beneath the head appears as if split its whole length into two parts, and these being placed so as to break joints are riveted or bolted together through their sides. Up to about the year 1854 the weight of rails had been steadily increasing from about 35 lbs. to the lineal yard, till it had reached in England 80 to 100 lbs.

No advantage was found in the very heavy rails, however, but on the contrary the iron in such large piles was necessarily less worked in the manufacture and was in a poor condition for wear. The tendency has since been to return to lighter rails, of 55 to 65 lbs. to the yard, and to require these to be made of iron originally good, the piles to be first rolled into blooms, and these to be again brought to a welding heat, and then rolled into rails. The miserable quality of much of the iron on American roads is due to deficient working, the fibres of the iron as it wears showing that they have never been thoroughly incorporated together. In bargaining for it no test and no particular conditions of manufacture were required, as is customary in other countries. Rails of 45 lbs. have worn under the heaviest traffic for 20 years, as those laid in 1837 on the Reading railroad, while others of nearly double the weight have given out on other roads in 1, 2, or 3 years. The first rails employed on the Stonington railroad, of 54 lbs. to the yard, also lasted 20 years. Rails have been made in lengths of 15, 16, 18, and 20 feet, and recently of 21; on one road in England 30 feet rails have been used. An important feature in the rail is its height or depth. Its stiffness, if the rail could be regarded as a rectangular beam, increases as the square of the depth; thus doubling the height and retaining the same weight of material quadruples the stiffness, but doubling the height and weight also increases its stiffness 8 times. The effect of a want of stiffness in the rail is deflection between the supports under the weight and a mashing of the iron into the wood of the sleepers, which continually increases the mischief. Even between rigid supports the temporary depression of the rail is such as to present a continual ascending plane in front of the wheels, which the descent of the slope from behind does not in any measure compensate, the advantage of this being wholly balanced by other considerations. But high rails require strong lateral supports. These on the English roads are furnished in the cast iron chairs on every sleeper, and by the stiffening of the rails at the ends by the peculiar joint in use; and the English are thus able to employ much deeper rails than are seen upon our roads. Unless of the ∩ form (and this is now little used), their rails are rarely so low as 4½ inches. They run from this to 5½ inches, and present a head of about 2½ inches, the surface of which is convex, the curve having a radius of about the height of the rail. The American rails differ from these chiefly in the height, which is rarely so much as 4 inches, but commonly about 3½. On the Camden and Amboy road was laid a rail of 92 lbs. to the yard, with a broad foot to secure lateral support, and of the extreme height, first introduced in England, of 7 inches; but the use of such a rail has not been adopted on other roads. High rails do not necessarily involve a great weight compared with that of many low rails now in use; for the latter often contain a useless amount of iron, especially in the bulge beneath the "pear-shaped" head, and also in the thickness of the web, which need not exceed ¾ of an inch. The excess of metal which does not add to the strength, and the presence of which actually interferes with the proper working of the iron to make rails of good wear, may amount to 12 tons or more to the mile; a saving well worthy of consideration, especially where iron commands a high price.—The securing of rails to the track and keeping their ends together are provided for by a variety of expedients. In all of them it is necessary to recognize the principle of contraction and expansion of the rails by changes of temperature, and in the laying of the rails proper allowance is always made for this; thus rails 20 feet long, at the temperature of 100° F., may be set close together at the ends. If laid at 80°, a space should be left of .032 in.; at 60°, .065; at 40°, .098; at 20°, .131; at 10°, .147; at 0°, .168; and so on. By neglect of this precaution it has happened that the rails heated by the sun have expanded so as to thrust upward, lifting the sleepers out of the ground to the height of one or two feet. From this cause, a train running in June, 1856, on the north-eastern railway in England, at [illegible] m. an hour, was thrown off the inside of a curve, though the 82 lb. rail was fastened every 3 feet in heavy chairs and "fished" at the joints. Almost the universal fastenings in England used to be cast iron chairs, made to hold the rail in an opening in the top, into which it was seated and keyed by a wooden wedge. The chairs were themselves strongly bolted down upon the sleepers. Those for receiving the two ends of adjoining rails are much heavier and stronger than the others, weighing from 26 to 39 lbs., the others 18 to 26 lbs. It is of great consequence to keep the ends of the rails securely upon the same horizontal line. If one end is depressed by the weight coming upon it, the wheel strikes the end of the next rail with a concussion that soon shatters the rail, and being repeated at other joints seriously injures the rolling stock. Various methods of keying the ends in the chair are in use, one of the strongest of which is that known as Burleigh's, with a tapering iron key 14 inches long. What are called [illegible] joints were designed in 1847 to keep the ends in line. As first proposed, two sleepers were to be placed 6 inches apart at the joints, and two plates of iron slightly wedging were to be driven one on each side between the jaws of the chairs flat against the sides of the two rails. Instead of this, however, a pair of plates 18 inches long, ¾ of an inch thick, and about 3 inches wide, are bolted together through the rails with ¾ or ⅞ inch bolts, the holes in the rail being elongated to allow for contraction and expansion. The same plan was tried in 1843 at New Castle, Del.; but it was found incompatible with low rails such as are used in this country. Though extensively used in Europe, the arrangement is open to serious objections; and the angle bracket was patented in 1853 as a substitute. This consists of two braces either of cast or wrought iron, each made with a flat foot, which is spiked to the sleeper upon which the joint comes, one on each side of the rail, and their upper edges fitting under its head are bolted together through the web of the rail. The wedge method in chairs is preferred on American roads, though the angle bracket is well adapted for the rails in use. Upon the Camden and Amboy road a singular connection called a ring joint is made to hold the ends of the rails. The face of the rails for two inches at each end is cut down so as to receive a strap, which is shrunk over them; the width of the strap is about 4 inches, and its thickness is just equal to the depth of the portion cut out. Rails are sometimes relieved from violent jarring by means of a cushion or spring of India rubber placed either under the rail or under the chair which holds it. A method of suspending the rails by a continuous bearing applied on each side under the head and bolted through the rail has been introduced in England within a few years past by Mr. W. Bridges Adams, and is regarded by many as likely to supersede all the other methods of supporting the rails. It is known as the suspended girder rail, and is used either with angle iron brackets or with timber bearers, one laid along each side the rail and bolted through. The angle brackets have the form of long flat strips of iron turned up longitudinally at right angles. They are placed with the angle under the head of the rail, the narrower part of 2 or 3 inches width fitting in the space between the head and foot of the rail, and the wider strip extending out horizontally from the under side of the head to a distance of 4 to 6 inches. Bolts pass through every 2 or 3 feet. No two joints are allowed to come opposite each other, and the three pieces are thus firmly secured together. The two rails are held to their gauge by occasional tie bars, which are fastened at their ends by some of the bolts which secure the brackets to the rails. The rail is of the common double-headed form, 7 inches deep, and is laid directly in the ballast. It derives its main support from the horizontal wings or brackets, and also bears upon its under surface. This arrangement secures great stiffness both vertically and laterally, and the load being taken directly under the head of the rail the web between the top and bottom may be of much thinner iron than is ordinarily used. In using timber bearers instead of continuous angle iron brackets, considerable saving is effected in the first cost, and an equally stable support is obtained. The timbers are scantling of equal depth to the side channel between the head and foot of the rail and about 5 inches width, thus making with the rail a bearing width of 10½ inches. Instead of bolts, flat bars of iron are used to secure them, passing through vertical slots, and held at the ends by keys. At the joints of the rail angle brackets are used 18 inches long bolted down to a cross sleeper.—In order that trains of cars may pass from one track to another an extra pair of rails are laid down, which can be moved so as to complete the connection with either one of the lines as desired and break it with the other. These movable rails are called switches, and are controlled by a long bar under the surface connecting with an upright lever at the side of the road. This is in the care of the men known as switch tenders, whose duty it is to see before the approach of every train that the rails are so placed as to carry it upon the right track. Turn tables are circular platforms which can be pushed round upon a circular track sunk below the level of the ground. A locomotive or car being run on to the platform, it is thus easily turned about or directed upon any other diverging track, numbers of which usually concentrate around the turn tables.—In treating upon railroads numerous important considerations present themselves beside those already noticed, each of which should receive particular attention. Such especially are the viaducts, bridges, and tunnels, and the immense cuts or excavations and embankments; also the processes employed by the engineers in laying out the road, their seeking for the most level and the straightest line while restricted by the amount of means provided, and planning the excavations and embankments, so that the material supplied by the former shall amount as near as may be to that required by the latter. The station houses, which in themselves are an important class of structures peculiar to this new improvement, merit a particular description; as also the varieties of carriages in use upon the road, the locomotives, &c. The last named will be noticed in the article STEAM CARRIAGE. Mention is made of some of the principal railroad bridges in the general article BRIDGE. A passing notice only may be given to the tunnels, always a remarkable feature of engineering, but especially so in the large scale upon which they have been constructed for railroads. In Great Britain they amount to about 70 m. in length, which is equal to about $\frac{1}{115}$ of the whole length of all the roads; and the total cost is estimated to average £102 for every mile of railroad. In the United States, in a total length of over 31,000 m., there are only about 13 m. of tunnel. In Great Britain it is considered cheaper to tunnel through rock than to make open cuts deeper than 60 feet. Where the rock is insecure at the sides and top the tunnel is lined with brick in several successive rings, and the upright arch is sometimes supported upon an inverted arch built under the rails. The longest tunnel is the Woodhead, at the summit of the Manchester, Sheffield, and Lincolnshire railway, its length being 3 m. 60 ft. The Standedge on the London and north-western railway is 3 m. long; and 12 others on other roads exceed 1 m. each. The Box tunnel on the great western railway, between Bath and Chippenham, is 3,123 yards long, or rather more than 1¾ m. It is 30 ft. wide, 25 ft. high, and 70 ft. below the surface. It is ventilated by 11 air shafts, most of which are about 25 ft. diameter. The Kilsby tunnel on the London and north-western railway is 1 m. 1,914 ft. long, 30 ft. wide, and 30 ft. high, 160 ft. below the surface, and is aired and partially lighted by 2 shafts of 60 ft. diameter. The total cost was £320,000, though contracted for at £99,000. The increased expense over the estimates was caused by quicksands. The Shakespeare tunnel through the chalk cliffs near Dover, on the south eastern railway, is composed of 2 narrow tunnels each 12 ft. wide and 30 ft. high, separated by a solid pier of chalk 10 ft. thick. It is 1,430 yards long, and is provided with 7 vertical shafts from the surface averaging 180 ft. deep. The tunnel laid out under the Alps between Modane in Savoy and Bardonecchia in Piedmont, to connect Italy with France, will when completed be about 8 m. in length, and at such a depth beneath the surface as to render shafts impracticable. It can therefore be worked from each end only, and serious difficulties must be encountered in ventilating as well as expediting the operation, which at the usual rate of excavation would occupy at least 40 years. A new method of ventilating and driving has been applied to this work, and by the machines now in use, according to reports received in July, 1861, the tunnel is extended on the Italian side rather more than 8 feet per day to a width of about 10 feet. Most of the tunnels upon American roads are on the lines crossing the Alleghany mountains. Through the main Alleghany ridge, near its summit, a tunnel was completed in Jan. 1854, for the Pennsylvania railroad, the length of which is 3,612 ft., width 24 ft., height 22 ft. To expedite the work and facilitate the removal of the rocky materials, three shafts, each measuring 6 by 10 ft. and of the respective depths of 150, 196, and 154 ft., were sunk from the surface down to its level; and a fourth of larger dimensions, 8 by 13 ft., was afterward found necessary; this was 194 ft. deep. The rocks are the nearly horizontal strata of the coal measures, the tunnel in great part lying along a bed of fire clay, which, though easily excavated, caused considerable expense in properly securing the walls and roof. The work was done in 2 years at a cost of $450,000. A great number of short tunnels are found on the line of the Baltimore and Ohio road, particularly on its extension, the north-western road of Virginia. The Blue ridge railroad crosses the Blue ridge in Virginia by a tunnel 4,273 ft. long on a grade ascending west of 70 ft. to the mile. Its height is 21 ft., greatest width 16 ft. The work was carried on from each end at the rate of nearly a foot every 24 hours. It was commenced in 1850 and finished in 1857, without shafts, at a cost of about $464,000. On the Blue ridge railroad in South Carolina three tunnels are nearly or quite completed in Pickens district, of which the shortest is 616 ft. long, and the longest, the Stump House mountain tunnel, is 5,864 ft. Four shafts are sunk from the summit to expedite the work. In the N. E. corner of Georgia, on the same road, are two tunnels. The long dock tunnel in Bergen, N. J., opposite New York city, was completed in 1860. It passes through the trap hills that extend from the Palisades S., and is 4,31[illegible] ft. long, 23 ft. high, and 30 ft. wide. Eight large shafts 70 to 90 ft. deep were sunk from the summit down to its level. The longest tunnel projected in the United States is that through the Hoosic mountain in Massachusetts, between the heads of the Housatonic and Deerfield rivers. The total length is 24,500 ft., or 740 ft. over 4⅔ m.; the height is 18 ft. and width 14 ft. The mountain is of mica slate and quartz rock, and rises 1,700 ft. above the level of the tunnel, so that shafts have been considered entirely out of the question. One, however, was started in 1861. In May, 1860, the work had been pushed in 1,683 ft. on the E. side and 800 ft. on the W. With such means as are at command for ventilating, it would seem to be almost a hopeless undertaking to endeavor to penetrate this mountain. Should the task ever be accomplished, the distance from Troy to Boston will be reduced from 208 to [illegible] m., with an important reduction also of the grades and curves.—The comparative economy in the construction and working of railroads in different countries is a subject of the first importance, and one to which many competent engineers have given particular attention. While the English roads exhibit an extraordinary amount of first cost, it does not appear that the expenditures for actual construction have been in much larger proportion than in the United States, but it is the extremely heavy out-[illegible] expenses that absorb the capital. Still, though the same amount to the mile should be expended for the construction of the road in both countries, a great difference would be observed in the result from the greater cheapness of labor and materials in England. This is shown by the following estimates, one for each country. The former is for a thoroughly first class road with ample slopes and ditches, deep ballast, a 70 lb. rail, fish-jointed, and the sleepers chemically preserved to last 15 years. The second, or American line, has scanty earthwork, thin ballast, a 60 lb. rail, with open joints, and the sleepers destined to decay in from 5 to 7 years.

ENGLISH ROAD, 70 LB. RAIL.

25,000 cubic yards earthwork at	$[illegible]	20	$[illegible]
6,000 " " ballast	0	[illegible]	1[illegible]
110 tons of rails, punched	[illegible]	04	4,[illegible]
50 " cast chairs	26	[illegible]	1,[illegible]
1,848 wood sleepers, creosoted	1	[illegible]	2[illegible]
6 tons of spikes	[illegible]	[illegible]	[illegible]
5 tons 18 cwt. fish plates	46	[illegible]	[illegible]
1 ton 3 cwt. 2½ qrs. bolts and nuts	97	[illegible]	114
Laying			3[illegible]
Total			$13,[illegible]

American Road, 60-lb. Rail.

[illegible] cubic yards earthwork at	$0 20	$6,000 00
1,000 " " ballast	0 25	250 00
94.3 tons iron	65 00	6,130 00
2,640 sleepers	0 28	740 00
1,000 chairs	0 20	200 00
5,500 lbs. spikes	0 06	330 00
Laying		250 00
Total		$14,526 00

Among the great items of cost upon English roads, the first in amount is compensation for land, the most extravagant prices being awarded and largely increased by numerous heavy charges. The average upon all the lines has been rated at $45,000 per mile, or more than the entire average cost of American roads. The "parliamentary expenses" incurred in obtaining a charter are also enormous. Upon 6 lines these have amounted to an average of $7,254 per mile, while on several others this amount has been very far exceeded; the great northern, for example, having paid about $5,000,000, which for 314 m. of road is about $16,000 per mile. The several items included in financial management, as interest, discount on loans, bonuses, &c., are estimated at full $20,000 per mile. Larger expenditures than are usual in the United States are involved from the more unfavorable physical features of the country, the topography presenting no long lines of water courses, nor wide table lands, both which are common in this country. Boggy districts are also more frequent in England, and the construction of a permanent road across these has often cost immense sums. Even when the embankments through them have been apparently completed, as much more material has in some cases been required for their maintenance in consequence of their subsidence. The bridges, viaducts, tunnels, &c., are much more numerous and expensive structures upon English than American roads. The superior equipment of engines and carriages adds a considerable amount to cost per mile, some of the roads having even more than a locomotive for every mile, the cost of which averages about $12,000 each. Among the heavier items of expense are the approaches to the cities, London particularly. The roads for several miles are frequently constructed upon arched viaducts of brick. The London and Greenwich line, 3¾ m. long, thus built, cost $1,299,651 per mile; the London and Blackwall, of the same character, cost $1,406,004 per mile. From such causes the total cost of English roads has amounted to about $179,000 per mile. The French double track roads in 1857 were estimated to have cost $101,877 per mile; about ⅓ of the whole was for earthwork and "works of art," as bridges, viaducts, and tunnels; ⅓ for rails, chairs, ties, and keys; and $6,039 for ballast, much more even than upon the English roads. Few roads in the United States have reached an expenditure for construction equal to that of the least expensive roads of Great Britain; and the average cost of all those of the United States is estimated at less than $40,000 per mile. The effect of the more finished condition of English roads is shown in a remarkable degree in the comparative cost of maintenance of way, or of keeping the roads in working order, and of the running expenses, as exhibited in the following table, prepared from the results of the working for 1855:

Names of roads.	No. of miles of single track.	Average number of trains daily each way.	Average cost of repairs per mile of single track.	Average cost of repairs per mile run, in cents.
London and North-Western	1,290	21.7	$402.36	8.24
Eastern Counties	1,152	13.8	450.22	4.90
London and Brighton	654	19.50	544.05	8.13
Great Northern	620	20.97	780.14	8.82
New York Central	862	12.40	613.03	54.96
New York and Erie	741	18.20	657.57	14.64
Harlem	136	9.63	704.29	56.16
Average of New York roads	2,542	10.80	656.97	28.26

In 1857 the average expenditures for maintenance of way per mile run on the English roads were estimated at 10.50 cts., in France at 7.8 cts., and in the United States at 25 cts. In the consumption of fuel a difference quite as striking is observed. In Great Britain the distance run to the ton of bituminous coal or of coke varies from 75 to 118 m., the latter having been attained for a full year on the Cork and Bandon line in Ireland, the fuel being coke. A fair average is considered to be 77 m. On the Baltimore and Ohio road in 1857, for every ton of bituminous coal consumed the number of miles run was 33¼; and on the Reading road, for every ton of anthracite, 19.1 m. Allowing 1½ cords of wood as an equivalent to a ton of coal or coke, the comparative running of the trains on the roads of the northern states is about 25 m. As regards loads, the English trains, though drawn by heavier engines, are lighter than the average of American trains; but this is offset as to cost and wear by the greater speed at which they run. The estimated number of passengers to the train in 1855 was 46, upon the Massachusetts roads 53, and upon those of New York 72.6. On the New York roads the number of tons to each freight train was 71.2. The rate at which trains are run upon the English roads is not so high as it was formerly. Passenger trains run from 18 to 40 m. an hour, the latter being the speed of some of the express trains; the average rate is about 27 m. Freight trains average about 15 m., including all stops. The highest rate attained for a few miles together has been 93 m. per hour. A speed of 60 m. is made daily for short distances, and sometimes even of 75 m. an hour. The average speed is considerably greater than on the French roads, and full 25 per cent. greater than on the American. In 1854, when the trains were run at the highest speed in Massachusetts, passenger trains averaged for the year about 24 m. an hour, and freight trains 12⅝ m. The same was the average rate of passenger trains in New York in 1855; express trains running 33 m. an hour and accommodation trains 22 m., and the average being 24 m. In 1861 the rates of the express trains between New York and Boston are 29½ m. an hour, distance 236 m.; on the New York central road 26 m. an hour, distance 290 m.; on the Hudson river road 24 m. an hour, distance 144 m.; on the Erie road 22 m., distance 459 m. The last is the rate between New York and Philadelphia; and between Philadelphia and Baltimore it is 24 m.—*City Railroads.* Although railroads were long used in Great Britain with horse power only, this method of working them has been there generally abandoned; but in the United States their peculiar adaptation for the streets of cities was early perceived, and they are now in use upon the principal thoroughfares of most of the cities. Cars carrying from 25 to 40 passengers are easily drawn by two horses at the rate of 5 or 6 m. an hour, and take the place of a much larger number of omnibuses, running at the same time at considerably less expense. The trucks turning upon pivots, the carriages turn round the corners of the streets without difficulty; and the rails being laid nearly flush with the surface, no obstruction is presented by them to the passage of vehicles across the track. The importance of this application of railroads being fully established by long trials, an American (Mr. G. F. Train) undertook in 1859 to introduce them into England, and in 1861 the first roads of this character were in successful operation in the streets of Liverpool and London.

RAILWAY, ATMOSPHERIC. See ATMOSPHERIC RAILWAY.

RAIMBACH, ABRAHAM, an English engraver of Swiss extraction, born in London in 1776, died in 1843. His plates after Smirke for Foster's illustrated edition of the "Arabian Nights" first brought him into notice, and subsequent to 1812 he enjoyed a considerable reputation for his line engravings from the chief pictures of Wilkie. Among these were the "Rent Day," the "Village Politicians," the "Cut Finger," "Distraining for Rent," &c. His autobiography was printed for private circulation by his son, under the title of "Memoirs and Recollections of the late Abraham Raimbach, including a Memoir of Sir D. Wilkie, R.A."

RAIMONDI, MARC' ANTONIO, an Italian engraver, born in Bologna in 1487 or 1488, died subsequent to 1539. He was instructed in design and *niello* work by the Bolognese painter Francesco Francia, some of whose pictures he engraved as early as in his 15th year. Subsequently he imitated Mantegna and Albert Dürer, and while on a visit to Venice made facsimile copies on copper of the latter's set of 36 woodcuts representing the life and passion of the Saviour, to which, according to Vasari, he attached Dürer's monogram. The plates however are without the mark of that master; but another set of 17, representing the life of the Virgin, have his mark, and the imitation was so exact that Raimondi's prints readily sold for originals. Dürer was obliged to visit Venice to procure redress, and succeeded in preventing the further surreptitious use of his monogram. The career of Raimondi properly commences in Rome, whither he next proceeded, and where he was employed during the lifetime of Raphael in engraving the choice works of that master. Among the first of these were the "Death of Lucretia" and the "Judgment of Paris;" and as Raimondi gained in boldness and facility of execution, the professional relations of the two artists became very intimate. After the death of Raphael he was employed for some time in engraving the works of Giulio Romano, and he is also said to have excited the wrath of Pope Clement VII. by executing a set of obscene prints, for which he was thrown into prison. Having appeased the pontiff by an admirably executed plate after Bandinelli's picture of the "Martyrdom of St. Lawrence," he pursued his art in Rome with undiminished success until the sack of the city by the constable de Bourbon in 1527, by which he was reduced to poverty. He returned to Bologna, where he resided until his death, actively employed in engraving. For purity of outline, correct expression, and drawing, he was one of the most remarkable engravers on record. The British museum has 500 of his choicest productions.

RAIN, the moisture of the atmosphere condensed and falling in drops to the earth. Some of the principles connected with the formation of rain have been treated in the articles CLOUD, DEW, and FOG. (See also ANDES, ATMOSPHERE, HAIL, METEOR, and METEOROLOGY.) Little was known of the agencies by which the waters of the earth are raised up and form clouds which float in the atmosphere, and at last precipitate their waters back to the earth, until the enunciation of the theory of rain by Dr. James Hutton in 1787. The principle thus announced was mainly that when air is suddenly chilled its capacity of holding moisture in the state of invisible vapor is diminished, and the excess of moisture present becomes visible and is set free in particles which coalesce and form rain drops. Sir John Leslie illustrated and applied this principle as follows: "Suppose equal bulks of air in a state of saturation, and at the different temperatures of 15° and 45°, were intermixed, the compound arising from such union will evidently have the mean temperature of 30°. But since at these temperatures the one portion held 200 parts of humidity and the other 800, the aggregate must contain 1,000 parts, or either half of it, 500; at the mean or resulting temperature, however, this portion could only suspend 400 parts of humidity, and consequently the difference, or 100 parts, amounting to the 200th part of the whole weight of air, must be precipitated from the compound mass." For air not entirely saturated with moisture the amount set free would obviously be proportionally less. On account of the greater proportional capacity of air at high temperatures for holding water, it is also obvious that the higher the temperature at which the change takes place the greater is likely to be the fall of rain, and such is observed to be the case in the heavier showers of summer and of tropical climates. The cause of the chilling is supposed to be the meeting and intermixing of currents of air of different temperatures; and the amount of rain produced by this intermixture will depend upon the degree of saturation with moisture of the currents, the elevation of their mean temperature, and the difference of their respective temperatures. It has been supposed that this explanation did not sufficiently account for the magnitude of the phenomena as often exhibited, sometimes even unaccompanied with any appearance of commingling currents; and electrical action has been suggested as a possible means of retaining the particles of moisture in the air by repulsion among themselves, and that when freed from this influence they coalesced and fell as rain. While it is very possible that there may be some other agency by which the air is chilled beside that of an approaching current of colder air, the electrical hypothesis cannot be admitted until sustained by positive proofs.—The distribution of rain over the earth is governed by the winds and the local conditions of the surface. The chief source of the supply being the great oceans, and the winds sweeping over these and becoming charged with moisture, the precipitation must take place wherever it is gathered in quantities beyond the capacity of the air at its existing temperature to retain it; and thus it is along the equatorial belt that the rainy regions of the earth are in great measure found. For toward this belt in the northern hemisphere the trade winds almost universally blow from the N. E., and in the southern hemisphere from the S. E. As they meet under the equator the airs, intensely heated by the sun and charged to their fullest capacity with moisture, are turned upward, and ascend into the cool regions of the higher atmosphere. Here, being chilled, vast bodies of water are set free and fall back to the earth in torrents of rain. The frequent changes of temperature involved by these movements occasion violent squalls, tornadoes, and thunder storms, without the occurrence of which scarcely a day passes. The rains however are not constant, and in some portions of the rainy zone their fall is very generally limited to a few hours in the afternoon, the morning and evening being bright and clear and the nights cloudless. But in the East Indies, the Chinese seas, and about Sumatra and Java, the tropical rains are sometimes most frequent at night. The belt in which this operation goes on, and which encircles the whole earth, as the rings of Saturn encircle that planet, moves N. and S. with the progress of the sun in the ecliptic, forming a thick and protecting curtain against its rays for all those places over which its path is in the zenith. Thus the tropical rains move with the seasons, passing in our springtime N. from the equator to their N. limit at the summer solstice, when the belt swings back again with the sun, carrying over the regions which it twice crosses entirely a second rainy season, and at the winter solstice it reaches its southern terminus. The quantity of rain that falls is so great, that in the 78 or 80 days in which the belt is passing over the equator the total amount is estimated at 95 inches, or an average of 1.14 inches daily. A better idea is had of this vast amount by comparing it with the fall in the rainy days of other places, as in St. Petersburg, where the yearly rains, occurring in 169 days, reach only to 17 inches, or to a daily average of about $\frac{1}{10}$ inch. The width of the rainy belt is greater than that of the equatorial calms, as the rains encroach to some extent upon the bordering belts of the trade winds, as would occur by the lifting up of the sur-saturated airs into the elevated regions above the calm belt, and there overspreading to the N. and S. The exact limits of the belts cannot be defined even on the ocean; but the calm belt has been observed in July and August between lat. 7° and 12° N., or occasionally further in that direction, while in March and April it is between lat. 5° S. and 2° N. The whole sweep of the rainy belt from N. to S. is usually estimated at more than 1,000 miles. Upon the land the position of the belt is still more uncertain, the influence of the topographical features of the country very materially modifying the extent of the phenomena. Ranges of mountains covered with snow cause a sudden precipitation of all the moisture in the clouds, while extensive regions under the lee of the mountains receive no rain for years. The arid deserts too, by the strong heat reflected from their surface, disperse the rain clouds; and though, like the southern border of the great desert of Sahara, they may lie in close proximity to the rainy belt, little or no water may fall upon them. The great rainless districts of the globe comprise: 1, the whole N. portion of Africa (except a narrow margin on the Atlantic and the contiguous regions along the Mediterranean), thence extending through Arabia, a part of Persia or Iran, and a part of Beloochistan, to the N. borders of Hindostan, a territory altogether of about 3,000,000 sq. m.; 2, the desert of Gobi and the table land of Thibet and Mongolia, which carry the same desert range on to the N. E. into the borders of China and Tartary, and include 2,000,000 sq. m. more; 3, on the American continent, the desert region under the W. slope of the Andes along the Pacific in Chili, Bolivia, and Peru; 4, the small district of Cumana, the N. extremity of South America; 5, the W. coast of Mexico and a belt of country thence extending N. into Arizona. In other regions are numerous districts subject to droughts from their peculiar positions, such as being separated from the great sources of supply of rain by intervening mountain ranges, which also lie in the direction whence come the prevailing winds. All the rainless regions are not necessarily deserts, the moisture held in the atmosphere and deposited as dew being sufficient to sustain vegetation. This is the case at Cumana, and various places on the W. coast of America; and also in upper Egypt and other portions of the dry regions of the East. Fertilizing streams moreover may have their sources, like the Nile, in the districts of the tropical rains.—Nowhere is the effect of the winds upon the distribution of rain more marked than in the Indian ocean in the region of the monsoons. During the prevalence of the S. W. monsoons from April to October, the ordinary routine of the tropical rains is disturbed, and the parched deserts to the N. drawing the air in that direction, torrents of water are poured down upon the W. coast and the mountains of Hindostan; but the N. E. monsoons succeed and blow from October to April, bringing down upon the eastern coasts the waters raised up from the bay of Bengal. In temperate regions the distribution of rain, like the winds upon which it depends and the geographical features which affect its precipitation, is much more irregular, and, though in some localities fluctuating more or less with the seasons, cannot be referred, like the rains of the tropics, to well defined periods. In general the rain falls at all seasons, and the zones outside of the tropics are consequently known as those of "continuous" rains, in contradistinction to the inner zone of "periodical" rains; but in those localities where it is most frequent, it often happens that the quantity precipitated during the year is less than in other places where showers are more rare, but heavier. This is particularly the case when the comparison is made between the rains of the tropics and of the temperate latitudes. A diminution in the quantity is experienced in passing from the tropics toward the polar regions; and, as roughly estimated by Humboldt, the average depth which falls in the latitudes 0°, 19°, 45°, and 60° may be taken respectively at 98, 80, 29, and 17 inches. So from the coasts into the interior of countries, at least in the eastern hemisphere, a like falling off is observed in the supply of rain; and so far as observations have been made similar results are found to obtain in North America, though from the configuration of the sea and land the interior of this continent is open to supplies brought by the winds from the S. as well as from the Atlantic ocean. The mean annual quantity of rain and the number of rainy days are thus given, as observed in different parts of the world:

EASTERN HEMISPHERE.

Between lat. 45° and 50° N.	Depth of rain, inches.	No. of rainy days.
British islands	32	156
Western France	25	152
Eastern France	22	147
Central and N. Germany	20	150
Hungary	17	111
Eastern Russia, Kasan	14	90
Siberia, Yakootsk	?	60

WESTERN HEMISPHERE.

Between lat. 41° and 43° N.	Depth of rain, inches.
Cambridge, Mass.	[illegible]
Western Reserve College, Ohio	[illegible]
Fort Crawford, Wisconsin	[illegible]
Between lat. 38° and 40° N.	
Philadelphia, Penn., and Lambertville, N. J.	[illegible]
Marietta, Ohio	[illegible]
St. Louis, Mo.	[illegible]

That the quantity of rain which falls upon par-ticular localities, though dependent upon the general laws of the distribution of rain, is ma-terially affected by local features of topogra-and temperature, is shown by records of annual fall. In the tropics of the eastern he-sphere this is estimated at 77 inches of w-and in the western hemisphere at 115 in-but at Paramaribo, Dutch Guiana, in la-49′ N., it amounts to 229 inches; at Maran-Brazil, in lat. 2° 32′ S., 276 inches have b-observed; and at Mahableshwur on the Ghauts, in lat. 18° N., 302 inches, which is the largest quantity ever noticed. At Singa-the annual mean is 190 inches; at Mar-Guadeloupe, lat. 16° N., 286 inches. At o-places in latitudes crossed by the rainy b-striking contrast to these figures is obser-At Santa Fé de Bogota, lat. 4° 36′, the fa-89 inches; this is at an elevation of 8,684 f-and mean temperature of 58° F.; at Marma-lat. 5° 27′, 64 inches, elevation 4,674 feet, m-temperature 68° F. At localities within the tropics but outside of the rainy belt, wh-periodical rains following the sun prevail-least upon the land, but with less violence th-in the equatorial belt, the differences obser-are less marked. At Vera Cruz, lat. 19° 11 N. the annual fall was found to be 64 inches; a-Havana, lat. 23° 9′ N., 91 inches; at Calcutta lat. 22° 35′, 76 to 118 inches. In the tempera-regions the mean annual amount of rain in the eastern hemisphere is 34 inches, and in the western 39; considerable differences, however exist in different places. At Brussels and Paris the fall is 19 inches; at Florence, 4-Lyons, 39.5; Marseilles, 18.4; Rome, 31 to 38; the Great St. Bernard, 60; London, 2-to 25; Glasgow, 21.33; Edinburgh, 25; Liverpool, 33.3; Manchester, 36.14; S. W. coast of Portugal, at Lisbon, 27; Madrid, not more than 10. In contrast with this minimum amount Coimbra, at the W. foot of the Sierra d'Estrella, in the valley of the Mondego in Portugal receives more rain than any other place in Europe, the quantity observed having been variously estimated at 118, 123, 135, and 2-inches.—In other latitudes beside the tropics the fall of rain is not uniformly greater in the summer than in the winter months, but sometimes the opposite. In London, from January to July inclusive the results of 40 years' observations give a fall of 8.529 inches, and from July to December inclusive 12.147 inches. The following is a statement by Prof. Daniell of the amount that fell each month of the year:

Jan.	1.483	April	1.786	July	2.516	Oct.	[illegible]
Feb.	0.746	May	1.853	Aug.	1.453	Nov.	[illegible]
March	1.440	June	1.830	Sept.	2.193	Dec.	[illegible]

Usually in temperate regions the greater portion of the rain falls in the autumnal months, and until the rivers have been filled by them the cold weather of winter rarely sets in. Excessive rains occasionally occur even in regions where moderate rains only prevail, and a large portion of the year's supply has been known to fall in the course of a few hours. At Catskill, N. Y., on July 26, 1819, the extraordinary fall of 18 inches occurred in 7½ hours. ("American Journal of Science," vol. iv.) In a day and night, Oct. 25, 1822, a fall of rain at Genoa amounted to 32 inches. At Joyeuse in the S. of France, Oct. 9, 1827, in 22 hours the fall amounted to 31 inches. But in the tropics such excessive floods are not so rare. In the month of July, 1825, nearly 69 inches fell at Aracan in Burmah, lat. 20° 20', and in August about 42 inches; and at Cayenne, lat. 4° 56' N., as stated by Capt. Roussin, there fell 151 inches from the 1st to the 24th of Feb. 1820. From such extraordinary rains there result disastrous floods, accounts of which are recorded in the annals of most countries as having occurred at intervals from very remote times; and on the other hand much more disastrous effects are recorded as occurring from droughts, the result of long continued want of rain.—As rain is a product of distillation, carried on by nature, the water that falls should be pure unless it meets in its progress to the earth foreign substances which it may take along either mechanically or in solution. The carbonic acid of the atmosphere, and ammonia also which often exists in the air, are the most frequent impurities present in rain, both which, if at all objectionable, are expelled by boiling. Nitric acid is sometimes detected in it, particularly in thunder storms, and is supposed to be a product of the combination of the nitrogen of the ammonia with oxygen of the air, the union induced by the electrical discharge. Many instances are recorded of solid bodies common to the earth being brought down by the rain, such as fish, frogs, a great variety of vegetable substances, as pollen, &c., and also mineral substances. All these, it is now well understood, are first raised up by whirlwinds or water spouts, and being carried by the rush of the winds to such distances as these are capable of supporting them, they then fall to the earth by their own gravity.

RAIN CROW, or RAIN BIRD. See CUCKOO.

RAIN GAUGE. For ascertaining the amount of rain which falls upon any locality, instruments are employed called rain gauges, ombrometers (Gr. ὄμβρος, rain, and μέτρον, measure), or pluviameters (Lat. *pluvia*, rain, and *metrum*, a measure). For a rough estimate any cylindrical vessel, as a tub, presenting equal areas at all points, might answer this purpose, the depth of water that falls being measured before any material diminution could have occurred by evaporation. But beside this source of error another is involved (from which indeed most of the rain gauges in use are not free) in the mouth of the vessel being formed of vertical sides, against which the winds that often accompany showers cause eddying currents of air, which seriously affect the amount of rain received in the aperture. To guard against the loss by evaporation, funnels are employed to receive the rain and convey it into some narrow-necked vessel beneath, which may be graduated either upon its own surface, if of glass, or upon an upright glass tube, connected at bottom with the receiving vessel, so that the water shall stand at the same level in both; and the divisions of the scale should be such that the unit may represent a quantity equal to the capacity of the mouth of the funnel and one inch depth. The funnels are commonly made of the area of 100 inches. The apparatus adopted by the Smithsonian Institution consists of a water-tight cask sunk in the ground to within 3 inches of its upper edge; this is covered with boards, which slope away from the centre and project a foot or more beyond the barrel, and over the boards are placed sods to imitate the natural ground. In the centre is left a circular aperture for the funnel, which is secured by two "clasps" to the board cover. The funnel projects a few inches above the cover, and is smaller at the mouth, which presents an area of 100 inches, than it is at the level of the cover. The sides are thus sloped outward down from the mouth to lessen the influence of eddying currents. At the bottom of the barrel is placed an earthen jug, into the mouth of which is introduced the spout of the funnel, exactly filling the opening. Two graduated measuring glasses are also kept in the barrel, inverted upon two long wooden pins set in the bottom. To determine the amount of rain that has fallen, the funnel is lifted out, and then the jug and the measuring glasses. The divisions of the larger one containing each a cubic inch of water, every one of these represents $\frac{1}{100}$ of an inch fallen into the rain gauge, and they are large enough to admit an approximate estimate of the thousandths, which, however, can be exactly measured by the smaller glass, that is graduated for this purpose. It is sometimes desirable to try the rain gauge upon elevated situations. Whenever this is done upon a roof, it should be placed several feet above the top and away from corners and the edge. In some of the observations made in Europe with the rain gauge, a singular difference has been noticed in the quantity of rain which falls at different elevations in the same locality. For a period of 12 years at the observatory at Paris the excess of rain falling in the court over that falling on the terrace, 92 feet above this, was estimated to amount to about ⅛ the larger quantity; and from similar observations in England it appeared to be established that the quantity received at the lowest levels was always greater than that in superior elevations. This was accounted for on the supposition that the lowest strata of air were highly charged with moisture and added their quota to the rain drops until these reached the earth. Prof. A. D. Bache threw much doubt upon these conclusions by his experiments in Philadelphia in 1833, in which he proved the extraordinary influence of the currents of air deflected from the walls of buildings in modifying the amount of water received in the rain gauge. This was strikingly exhibited in trials made upon the top of a shot tower 162 feet high, the rain collected at the same time at the different angles varying greatly in quantity. In general the gauges to leeward received more rain than those to windward; and in one extreme case the quantity collected at the S. E. angle was 2¼ times that at the N. W. angle.

RAINBOW, a circular arch of variously colored light, visible usually on a portion of sky overspread with falling rain drops, and in its ordinary forms always opposite to the place from which the sun or moon is shining at the time. When the field of falling drops is large, and the illumination thrown on it is bright, a second bow, exterior to and concentric with the first, appears. The inner, or most usual, is termed the primary, the outer the secondary bow. Each shows the same colors, and in the same succession, as those obtained in decomposing a beam of sunlight; the difference being, that the spectrum constituting the rainbow may be regarded as wonderfully extended on both sides, and curved into a circular form. In fact, the bow is always part or the whole of a complete circular spectrum; and it can be exactly imitated by passing an intense beam of light through the entire refracting edge or angle of a circular glass prism, and receiving the miniature rainbow thus formed on a white screen. The eye, however, does not readily discern in it all the prismatic colors, the breadth being limited, and the gradation of colors quite insensible. In the two bows, the colors lie in opposite order; in the primary the red is outermost; in the secondary it is innermost. The primary is always the brighter, and distinctly the narrower. When the light is abundant, this bow is often accompanied with successive bands of red and green, lying just within it or overlapping its violet edge, concentric with it, though usually through parts of its course only, and especially where it nears the horizon. These are called supernumerary bows. The writer has observed one distinct red and green band, and very bright, lying within the primary bow and continuous through its whole extent, when, the sun having nearly set, the bow had risen to near its greatest altitude. The common centre of the two bows is always in the straight line, prolonged, that passes through the centre of the sun and the eye of the spectator; so that, of course, the rainbow rises at the same rate as the sun declines, and declines if, the time being morning, the sun is rising. —The conditions requisite to produce the rainbow have been in a general way understood from an early period, though its causes were not so. The earliest known attempt at an explanation of it is that of Aristotle. He observed that from a glass globe filled with water and set in the sun, certain colors were always returned at certain angles with the course of the sun's beams; and he properly explained the circular form of the bow, by saying that if the sunbeam passing through the observer's eye be taken as an axis, and the globe be revolved round this axis, and at the same distance from it in all parts of its course, the same colors, preserving their angle with the direction of the sunbeams or of the axis, would be visible throughout all parts of this course; and hence it follows that a rainbow would result if there were globes enough, and so placed as to reflect colors at the same time from all parts of an arc of such a circle. The colors, however, were supposed to be merely reflected from the globe, or (in the sky) from the drop of water, until Fleischer of Breslau (1571), concluding that reflected light does not give colors, stated as a consequence that the rays must enter the drop. Of the light falling on the presented side of the drops, of course part will be reflected, but another part will enter and be refracted at the same time; striking on the inner opposite surface of the drop, part of this beam will emerge and escape, while another part will be reflected; and on again striking the side of the drop toward the spectator, though a portion of the residue of the first beam undergoes a second reflection, another portion emerges, again refracted, and, if at a proper angle, then passes to the eye. Kepler agreed in this view, but erred in supposing the entering light to be that of rays grazing or tangent to the upper sides of the drops. Antonio de Dominis, in 1611, carefully repeated the experiments with the glass sphere filled with water—these being easily performed, and showing in sunlight very vivid colors at great distance, and each at an angle of its own. Newton, however, gives to De Dominis undue credit, and unquestionably through his jealousy of Descartes, who in fact completed the explanation of the rainbow, with the exception of a single link, finally added by Newton himself. Descartes showed: 1, why there must be on the illuminated field of falling drops a circular belt of colors bright enough to be seen, and always of a definite diameter; and 2, that the colors are in separate bands or stripes in this, because they are not equally refracted. He gave the reasons why the colors must be just where they were, and in bands just so broad, if they all appeared; he could not tell why they all must appear. This element Newton supplied, when he discovered (1672) that sunlight is decomposable into a fixed number of different colored rays, refracted or bent at the same time in different but definite degrees, so that they must appear, under given circumstances, separated just so much, and always in the same successive order. This result will follow, then, whether sunlight is dispersed by prisms, or by transparent spheres, as water drops are. The mathematical theory, which belongs to Descartes, may be found in the higher text books of optics. It is very clearly stated in Olmsted's "Philosophy" (revised ed., New York, 1869). It will be proper to give a brief outline of it in this place. If a ray of light pass through the centre of a sphere or drop, its course is in an axis of the sphere or drop; it is not refracted. A ray parallel with this, and very near it, is refracted within the drop, toward the axis, but very slightly. Other rays, further and further from the axis, are refracted more and more toward it, but yet so as to fall, by lessening degrees, further from it on the inner or second surface of the drop; until, as Descartes proved, a ray entering the upper side of the drop, when this is above the eye, and at a point on it distant by an arc of 59° from the axis, will strike, on the inner surface, as far as any ray can do from the axis; the rays incident at greater arcs than this, up to 90°, deviating again toward the axis. Of course, near this limit, the deviation is very slight for rays coming on either side, so that much more light within the drop will be accumulated just at this point of the second surface than at any other; and though part of it emerges here, a sufficient quantity is reflected, and that in rays which preserve a parallel course after leaving the drop in the direction toward the spectator, to form a compact, parallel beam, bright enough to affect the eye at a great distance. Light falling on other parts of the drop is reflected, transmitted, or refracted so irregularly, that it is diffused and feeble, and but slightly affects the eye. Now all the rays thus entering the upper or outer sides of myriads of rain drops are sensibly parallel with a ray or line—the axis of the bow—from the sun's centre through the eye of the spectator. Calculation shows that the angle which the compact and visible emergent beam of red rays will make with the incident sunbeam, and hence with the axis of the rainbows, or line through the eye, is 42° 2′; that for the violet light 41° 17′; the other colors being at angles between these. Hence, all the other colors must be seen, in their order, upon drops lower and lower down, compared with the place of the red band; and the breadth of this bow will be 1° 45′. If, now, these rays, coming to the eye at such angles with the axis or course of a sunbeam at the time, be for the moment imagined to be inflexible wires, reaching from the eye out to the cloud, and (remembering that the angles must continually be the same) be revolved completely round the axis of the bow, there will result a complete circle, the larger portion of it usually below the horizon; the part above the horizon, and so visible, is the primary bow. The explanation of the secondary bow is in principle the same, with the difference that this is formed by light entering the drops near their lower side, or that toward the axis of the bows, which undergoes two reflections and emerges from the upper near side of the drop toward the spectator. The rays that can still, after two reflections, emerge in a parallel and relatively bright beam, have also their limit of divergence within the drop; and they are those entering at an arc of 71° and 72° from its axis; when they emerge, the angle the compact red beam makes with the axis is 50° 57′; the other colors following in order to the violet, whose angle is 54° 7′. The breadth of this bow is thus 3° 10′. The colors are reversed because the rays under two reflections have been made to cross themselves. The bow is more faint, in part owing to its greater width, and in part to loss of light by an additional reflection. The breadth of the space between the two bows is 8° 55′. But though the angles stated above for the primary bow are those of the greatest deviations for the red and violet by one reflection, yet, within 41° 17′, all the colors may emerge, and do so, though in more feeble degrees, at all angles down to 0°. Again, while the angles given for the secondary bow are those of least possible deviation within the drop, yet in a more feeble degree all the colors may emerge at all angles from 54° 7′ up to 180°. The consequence is, that the whole visible sky, if the whole could be overcast with drops, save the point at which the sun shone, would be faintly lighted up with white light, save the bows themselves, and the space between them; and from this last space all light would be excluded. And it is easily observed that this belt of sky between the two bows is quite dark, while within the inner and without the outer bow a diffused illumination really exists. Thus, rainbows are the colored borders of illuminated segments of the sky; or they are concentric hollow cones of colored light, the intersections only of whose bases by the plane of the falling rain appear visible to us. A third or "tertiary" bow, due to three reflections, and situated on the side toward the sun, at an angle of 40° 40′ from it, may be formed; but from its extreme faintness and unfavorable position, it is but seldom seen. It is stated that with a cylinder of water within glass, the bows have been distinctly traced and measured, growing successively broader and fainter, up to the 15th order.—From the above explanation, the following consequences are obvious: that the ordinary rainbows must be on the side of the observer opposite the sun; that their centre must be in that line already described as the axis; that they must move with the motion of the sun, declining in the morning, and rising if seen at evening; that when the sun and the observer are both in the same horizontal plane, as at sunset, the bows will be semicircles, and their altitudes then about 42° and 54°; that they can never approach nearer than this to the zenith, unless the observer be on an elevated position, so that the sun can shine from below the horizontal plane in which he is; that at the tops of high mountains they may be seen as complete circles; and that, to one at the ordinary level, in the low and middle latitudes, they are never seen between about 9 o'clock in the morning and 3 o'clock in the afternoon; while in higher latitudes, where the sun is often very low in the sky, they may occur even at midday. If the rain is near, the bows may sometimes be seen prolonged upon the landscape. The small water drops constituting spray may afford a rainbow. Hence, it is seen in the mist arising near cataracts, and, because near, is then small, and may appear as a complete circle. A partial bow may be observed in the mist created by whirling a wet broom; in the spray driven by the wind from the crests of waves; in that thrown up by the paddle wheels of steamers; and at times in drops of dew or rain upon herbage or grass. The formation of the supernumerary bows was explained by Young (1804), as due to interference of sets of rays emerging at angles very nearly those of the proper colors of the bows. Biot, and afterward Brewster, have shown that the light of both the bows is polarized in a plane cutting the sun and the eye, hence polarized by reflection.—The lunar rainbow is usually single, the primary bow only, and is often white; when colored, it is but faintly so. Very rarely, also, the solar rainbow is produced on cloud, *i. e.*, on vesicular drops, when it is called a "fog-bow;" and its diameter is variable, sometimes 34°, but always less than that of the proper rainbow. Col. Sykes ("Philosophical Transactions," 1835) saw such a bow from the top of a precipice 2,500 feet high, among the Ghauts, formed upon a fog cloud, while the sun behind him was low. It was near to him, a complete circle, apparently not more than 50 or 60 feet in diameter, and of most vivid colors; and in its centre, as in a splendid frame, appeared distinct images, in shadow, of himself, his companions, and horse. An outer faint bow was also seen. At another time, in India, he saw a bow upon a fog bank, perfectly white. Such a bow was once observed by Niebuhr, and once by M. St. John.

RAISED WORK IN METAL. Hollow articles in sheet metal, as tea and coffee pots, crucibles, thimbles, covers of vessels, &c., are generally produced from flat sheets, raised into the required forms by a variety of methods. One of these for articles only partially hollowed out, which are to be produced in great numbers, is by means of dies made of hardened steel, into which the metal is forced by a succession of blows from a drop hammer. These may be applied upon an upper hardened die having the same figure in reverse, and thus exactly fitting into the lower one. By this process, known as swaging, the gold plates for artificial teeth are formed between dies of lead and zinc. (See DENTISTRY.) For more complicated work, requiring a slowly progressive adaptation of the metal to the irregularities of the dies, several sheets are laid one upon another between them, and after each blow the bottom plate is taken out, and a fresh one is put in at top. Each plate is afterward finished singly by being struck into the die; and if the metal is not sufficiently ductile to take the shape without tearing, it must be annealed, a process which in many operations of this character requires to be several times repeated. Thimbles are struck between conical-shaped dies, of which several pairs are used, each successive pair approaching more nearly the final form. The metal may require several annealings in the process.—Another method which is practised for such hollow articles as tea pots, deep pans, crucibles, &c., is that known as spinning or "burnishing to form." In this process the disk of metal is held between two blocks applied to its centre, and secured to the mandrel of a lathe so as to revolve with it. A smooth, hard steel rounded point held in a rest is then pressed against the middle portion of the disk as it revolves, and a wooden rod at the same time is held against the edge on the opposite side of the disk to regulate the form into which the metal is bent back. The shape is also controlled in part by that of the block against which it is bent, and which thus serves as a mould. When the sides have thus been bent to fit this block, the piece is taken off from the mandrel, and if the article to be made is a tea-pot of which the neck is to be drawn in, a plain cylindrical block of the diameter of the required neck is substituted, and the partly hollowed sheet is attached to this as it was to the other. Being again made to revolve, the edge is turned down to the cylinder by means of burnishers of proper shapes, leaving the neck of its full size; and with a hooked stick the extreme edge is made to turn back and curl into the hollow bead which gives the finish and stiffness to the mouth of the vessel. Sometimes a mould is employed of the exact shape of the interior, formed of several pieces, which can be fitted together after they are introduced into the vessel, in the same way that the parts of a hat block or boot tree are fitted. The spinning process is very expeditious, and when uniformly conducted the form is perfect. For merely turning up the edges of metallic sheets machines are employed by silver and tin smiths, which, on turning a winch with one hand and holding the disk with the other, take the edge of the disk between two wheels and by one revolution bend it into the required form.—A third method of raising the surface of metallic disks is by the hammer; and by this means the largest vessels constructed by the coppersmith are fashioned, as the great pans and stills of many hundred pounds weight each used by the sugar refiners. The method is also applied by silver smiths to shaping most of the hollow articles of their manufacture. The action of the hammer is really like that of the burnisher, the blows being applied in successive circles round the metallic sheet, with the object of regularly approaching the desired end. Various sorts of hammers are used with faces specially adapted for the sort of curved surface to be produced, and the anvil or bed upon which the articles are supported is shaped with reference to the same object. Every blow given with the hammer is either intended for stretching the sheet, as when it strikes fair upon the metal, then supported upon a full bearing surface, or it is intended to bend it, when it rests over an edge of the anvil, or is placed over a cavity into which it is to be driven by swaging. It is extraordinary with what accuracy this work is conducted; thus a skilful workman knows exactly the size of the disk which will suffice to produce any required object without any deficiency or excess. For example, in making a hollow ball 6 inches in diameter, 2 disks of copper are required, each of 7½ inches diameter, or (roughly estimated) 23½ inches circumference. Each one is to make one of the hemispheres of the ball. By hammering judiciously the diameter of the disk is increased by this stretching or hollowing out of the sheet to 9 inches, while the circumference at the same time becomes contracted to 18 inches, which gives the required diameter of the ball. The great art of the workman consists in correctly estimating these effects and bringing out the result in a sheet of uniform thickness and with the least possible number of blows. In articles of complicated figure it is evident that long practice is required to attain this skill; and the methods are of a nature impossible to explain without the aid of illustrations. Reference may be made to Holtzapffel's "Mechanical Manipulations," vol. i. p. 398, where the subject is fully treated. A remarkable example of this kind of work is the ball and cross of St. Paul's cathedral, London. The copper ball is 6 feet in diameter and ⅛ inch thick, and is raised in two pieces only. The metal was first thinned and partly formed under a tilt hammer at the copper mills, and sunk in a concave bed; the raising was effected with hammers but little larger than usual; the two parts were riveted together in their place, and the joint is concealed by the ornamental band. The work on the cross also is hammered up. The consoles beneath the ball are of gun metal. The whole height of this metallic structure is 29 feet, and it contains 3¾ tons of copper, beside about 2 tons of iron used in framing and bracing within. In the gilding 33 ounces of gold were used.—Raised work in the precious metals is called chasing, and is effected by hammering, by punches, &c., furnished with grooves, and burnishing tools. (See Enchasing.)

RAISIN (Fr., a grape), the dried fruit of the grape vine. In various countries where the grape is largely cultivated, and especially in the regions around the Mediterranean, the fruit, after ripening, is dried either in the sun or in ovens, and is then packed in boxes or casks for domestic use and foreign export. It has long been a commercial product of no small importance. The varieties recognized in trade are not very numerous, but their differences from each other are strongly marked. These arise not merely from the original differences in the grapes, but also from the methods of drying. Among the best sorts are those known as the Malaga, Muscatel, or "sun raisins." These are dried upon the vines, the stem of each bunch when ripe being partially severed, and the leaves that shade it being picked off. Thus exposed, the grapes soon shrivel by the evaporation of the water they contain, and become sweeter by the consequent concentration of the pulp. When dried the bunches are taken off and carefully placed in boxes with sheets of paper separating the layers. These raisins, better than any other sort, retain the freshness and bloom of the fruit, and acquire less of the saccharine deposit which is found upon most of the other varieties. Other raisins are prepared by drying the ripe grapes after they are picked, either in the sun or in heated rooms, and while they are drying sprinkling an alkaline lye over them. The effect of this is to cause a saccharine exudation to take place, which forms concretions upon the raisins and coats them with a thin varnish. The raisins known as *lexias* are so called from the lye employed, and include the varieties called Valencia and Denia. The best of these are hung on lines to dry in the sun, and as they begin to shrivel they are dipped in the lye once or twice and hung up again to complete the drying. Of Turkish raisins two varieties, the sultanas and black Smyrnas, are the best known. The former are from a small delicious grape without seeds, and come packed in drums. The latter are also small raisins, but have very large seeds. They are generally free from the sugary concretions which are common to the other sorts.—A very important variety of raisins, and one rarely understood to be the fruit of the vine, is the "dried currant" of commerce. This is a very small-sized grape, largely cultivated at Patras, in Zante, Ithaca, and Cephalonia, and in the Grecian archipelago; its name is a corruption of Corinth or Corinthian grape. The grapes are no larger than peas, and the bunches are only about 3 inches long. They are laid up to dry in the sun, in heaps called *couches*, and are then deposited in large quantities in rooms called *seraglios*, where the masses become so compact from the sticky quality of the sugar which exudes from them, that they have to be forcibly dug apart for packing. For shipment they are placed in casks, and made into a solid mass by treading. The demand for these is very large in the United States.—Raisins are sometimes employed instead of grapes in the manufacture of wine, and among the ancient Romans and Greeks some of the best wines were of this character. Malaga wine has also been produced in this manner, and the Hungarian Tokay is made from half-dried grapes.—The importation of raisins into the United States during the year ending June 30, 1869, amounted to 54,448,630 lbs., chiefly from Spain, valued at $1,429,950; and of currants, 7,149,362 lbs., chiefly from England, Greece, and Austria, valued at $319,320.

RAJAH, a Sanscrit word signifying king, and applied to many princes, rulers, and petty chiefs of Hindostan, the countries lying E. of the bay of Bengal, various islands in the Indian ocean, and throughout the Indian archipelago.

RAJAHMUNDRY, a province of British India, presidency of Madras, bounded N. by Orissa, N. E. by Vizagapatam, S. E. and S. by the bay of Bengal, W. by Masulipatam, and N. W. by the territory of the Nizam; area, 4,501 sq. m.; pop. 1,012,036. The coast is low, and the port of Coringa is considered one of the best upon the E. shore of Hindostan. The only river of importance is the Godavery, which enters the province from the N., and after flowing about half its length divides into two branches, one of which runs S. and S. W. for 45 m., and the other S. E. and E. for 52 m., forming a delta that contains some of the most fertile land in India. The water of the Godavery is used for irrigation, and the river itself is navigated by boats and small steamers for some distance into the interior. In the neighborhood of the coast the surface is level and the soil for the most part fertile, but the N. and N. W. portions are hilly. The principal crops raised are rice, tobacco, indigo, cotton, maize, millet, various kinds of pulse, oil seeds, and sugar cane. Many cocoanut and other palm trees grow in the sandy soil along the sea shore. Cotton goods in imitation of those of Europe and America are successfully made at Samulcottah, and ship building is carried on to a considerable extent at Coringa.—RAJAHMUNDRY, the capital, is situated on the left bank of the Godavery, 265 m. N. E. from Madras; pop. about 20,000. It has a fort with mud walls.

RAJPOOTANA, RAJASTHAN, or RAJPOOT STATES, an extensive territory of Hindostan, bounded N. E. by the British districts of Butteeana and Kurreeana, and the native state of Jhujhur; E. by Goorgaon, Bhurtpoor, Dholpoor, and Gwalior; S. by the province of Omutwara, the territories known as Sindia's, Holkar's, and the Guicowar's, by Jaboah, and Myhee Caunta; W. by Sinde; and N. W. by Bhawulpoor. It comprises the British districts of Mairwarra and Ajmeer (area, 2,800 sq. m., pop. 262,000), and the native states of Alwur, Banswara, Bikaneer, Doongerpore, Jessulmeer, Joodpoor or Marwar, Jeypoor, Jhallawar, Odeypoor or Mewar, Tonk, Serohee, Kerowlee, Kishenagur, Pertaubgheer, Kotah, and Boondee (area 116,000 sq. m., pop. 7,560,000). The Aravulli mountains stretch across Rajpootana in a N. E. and S. W. direction. The greater part of the country lying W. and N. W. of this range is a sandy waste presenting an aspect nearly similar to the most desert tracts of Arabia and Africa. Oases occur at intervals, in the largest of which are the towns of Bikaneer, Joodpoor, Jessulmeer, Nagore, and Chooroo. The river Chumbul flows along the S. E. frontier, and the Lonee has a course of about 200 m. toward the S. W., where it is lost in the Runn of Cutch. S. E. of the Aravulli mountains there are several small lakes; and in many places abundant crops are raised by irrigating the sandy soil with water taken from the lakes or drawn from wells, some of which are 200 feet deep. Wheat, cotton, barley, millet, inferior opium, tobacco, sugar, and indigo are cultivated in different localities. Cloth, swords, and firearms are manufactured. —The inhabitants consist principally of Rajpoots, who are Hindoos, and of Mohammedans. The remainder of the population is made up of Bheels, Jains, Jauts, and Mairs. The Rajpoots, by far the most numerous, are supposed to be descended from the Kshattriyas, one of the 4 original castes into which the Hindoos were divided. Their empire appears to have been most powerful about the end of the 12th century, when Delhi, Ajmeer, Kunnouj, and Guzerat formed parts of it. In 1193-'4 they were several times severely defeated by the Mohammedans. In several other parts of India, as in Bundelcund, Rewa, Cutch, and Gurhwal, the race is still met with. They are all soldiers; each division has its military leader, and each forms a separate community. Some of the Rajpoot states became connected with the English East India company early in the present century, and since then the others have submitted to British protection.

RÁKÓCZY, a princely family of Transylvania, distinguished for its opposition to the house of Austria, and several members of whom were princes of Transylvania. Its most celebrated member was FERENCZ II., born in 1675, died in the castle of Rodosto in Turkey, on the sea of Marmora, April 8, 1735. After the death of his father and the surrender of Munkács after a 3 years' heroic defence by his mother, he was brought up under the care of the Austrian court, and during the insurrection under Tökölyi was placed under the Jesuits in Bohemia, who strove in vain to induce him to change his religion. Subsequently he received part of the Hungarian estates of his relatives, and was permitted to reside in that country. The disgrace of his family and the degradation of his country had sunk deep into his mind, and, accused of being engaged in a conspiracy to excite rebellion, he was taken in May, 1701, to Austria, and confined in the same dungeon at Neustadt from which, 30 years before, his maternal grandfather, Peter Zrinyi, had been taken to the scaffold; but he succeeded in escaping from confinement, and fled to Poland, where he remained a year and a half. Here he completed his arrangements with the disaffected Hungarians, and in 1703 suddenly appeared in the vicinity of Munkács, collected an insurrectionary band, and on June 7 issued a bitter manifesto against Austria. In this work he was supplied with money by France, then engaged in the war of the Spanish succession, and was so successful that after a short time he had almost all Hungary and Transylvania in his power, and even threatened Vienna. Negotiations were opened with the insurgents by the emperor Leopold I.

d his successor Joseph I., but, in spite of the ible moderation of Rákóczy, were all fruitless consequence of the high demands made by e more sanguine patriots. A diet was held Szécsény, and the revolted provinces and ties instituted a regular confederation similar those of Poland, Rákóczy, who had previously been elected prince of Transylvania, being trusted with the direction of the league with e title of *dux* (Hung. *vezér*). In Aug. 1708, e Hungarian leader while investing Trenthin was surprised and badly defeated by the strian general Heister, and Rákóczy himself caped with difficulty. From this time the ms of Austria were in the ascendant, and her ctories in the field were assisted by the dissensions which long before had manifested emselves among the confederates. Rákóczy ving gone to Poland, in order to meet with ter the Great of Russia, a peace was concluded in his absence between Austria and the confederates at Szatmár in Jan. 1711. Rákóczy ent first to France, in 1718 repaired to Spain, d from that country went to Turkey, and, companied by a number of his fellow refues, passed the remainder of his life at the cas of Rodosto. He wrote a narrative of the uggle in Hungary under the title of *Mémoires r les révolutions de Hongrie* (the Hague, 1739). e also composed meditations, hymns, soliloies, and a commentary on the Pentateuch. e name of Rákóczy has been given to the incipal Hungarian national march.

RÁKOS. See Pesth.

RALE, or Rasles, Sébastien, a French missnary to the North American Indians, born Franche Comté in 1658, killed at Norridgeock, Maine, Aug. 23, 1724. Having joined e Jesuits, he was engaged for a time in teachg Greek at a college in Nîmes. In 1689 he me to Quebec for the purpose of devoting mself to the Indians, and was stationed sucsively at the Abnaki mission of St. Francis ar the falls of the Chaudière, then in the Ilois country, and finally at Norridgewock on e Kennebec. He arrived here at least as rly as 1695. Most of the Indians were already Christians, and they even had a small urch in their village, where the missionary mained with the tribe during a part of each ar, accompanying them in all their hunt and fishing excursions, and winning their nfidence to such a degree that the Engh settlers ascribed their quarrels with the nakis to his influence. They accused him instigating the forays of the savages upon e settlements along the coast, and finally relved to destroy him, and set a price upon head. A party of New Englanders under pt. Hilton attacked Norridgewock in 1705, t withdrew after burning the church. A cond expedition in 1722 pillaged his cabin d the church, which had been rebuilt, but led to secure the missionary himself, who aped to the woods. Among the papers ich they carried off was his dictionary of the Abnaki language, which is now preserved in the library of Harvard college, and has been printed in the memoirs of the American academy of arts and sciences, with an introduction and notes by John Pickering (4to., Cambridge, 1833). In 1724 a party of 208 men from Fort Richmond surprised Norridgewock, killed a number of the Indians, and shot Father Rale at the foot of the mission cross, 7 chiefs who endeavored to protect him sharing his fate. His body was afterward disgracefully mutilated.—See a memoir of him by Convers Francis, D.D., in Sparks's "American Biography."

RALEIGH, a W. co. of Va., bordered E. by New river and drained by its tributaries; area, about 500 sq. m.; pop. in 1860, 3,367, of whom 57 were slaves. It has a mountainous surface, and in the valleys a fertile soil. The productions in 1850 were 40,511 bushels of Indian corn, 10,263 of oats, 2,890 of wheat, 4,929 lbs. of wool, and 21,289 lbs. of butter. Value of real estate in 1856, $510,260, showing an increase since 1850 of 112 per cent. Capital, Beckley.

RALEIGH, the capital of N. C. and seat of justice of Wake co., 6 m. W. from Neuse river, in lat. 35° 47' N., long. 78° 48' W.; pop. in 1860, 4,780. It is pleasantly situated on an elevation, and is very regularly laid out. In the centre is a park of 10 acres called Union square, from which extend 4 streets, 99 feet wide, dividing the city into 4 parts, in each of which is a square of 4 acres. The state house, one of the most splendid capitols in the United States, is built of granite, 166 feet long and 90 feet wide, surmounted by a dome, and surrounded by columns 6½ feet in diameter and 30 feet high. It is generally modelled after the Parthenon, and was erected at a cost of $500,000. The old state house, containing Canova's statue of Washington, was burned in 1831. Raleigh also contains a court house, gaol, 2 banks, 9 newspaper offices, 5 churches (Baptist, Episcopal, Methodist, Presbyterian, and Roman Catholic), and is the seat of the North Carolina institution for the deaf and dumb, and of a lunatic asylum. By the North Carolina railroad it has communication with all parts of the country; and the Raleigh and Gaston railroad connects it directly with Richmond, Va.

RALEIGH, or Ralegh, Sir Walter, an English courtier, author, and adventurer, born at Hayes, Devonshire, in 1552, beheaded at Old Palace yard, Westminster, Oct. 29, 1618. He was the son of a gentleman of ancient family, and was sent to Oriel college, Oxford, about the age of 16. He seems to have been distinguished in his studies, but he had been there hardly a year when he volunteered under Henry Champernoun, who commanded a small body of troops sent by Queen Elizabeth to assist the Huguenots of France. After serving about 6 years under Admiral Coligni, he proceeded to the Netherlands, and fought under the prince of Orange against the Spaniards. On his return to England he found people's minds filled with projects for colonizing the new world. His half brother, Sir Humphrey Gilbert, had just obtained a liberal patent (June, 1578) for establishing a plantation in America, and had little difficulty in persuading Raleigh to enter into the scheme. They put to sea in 1579; one of their ships was lost, the remainder, it is said, were crippled in an engagement with a Spanish fleet, and they returned without making land. The next year Raleigh distinguished himself in Ireland, where he held a captain's commission in the force employed in putting down the rebellion of the Desmonds. At the surrender of Smerwick he caused, under orders from his commander, several hundred Spanish allies of the Irish to be massacred. On his return to England, meeting the queen one day as she was walking, he spread his mantle over a wet place in the path for her to tread upon it. Struck by his gallantry, Elizabeth admitted him to court, loaded him with attentions, and employed him to attend the French ambassador Simier on his return to France, and afterward to escort the duke of Anjou to Antwerp. In her favor however he had a powerful rival in the accomplished Essex, and many romantic stories are related of the assiduity with which the two courtiers endeavored to supplant each other. Raleigh soon tired of an inactive life, and made use of his influence to promote a second expedition to America. Prevented by an accident from going in person, he left the command of the fleet to Sir Humphrey Gilbert, who sailed from Plymouth with 5 ships in June, 1583, and reached Newfoundland, of which he took possession in the name of the queen. One of his vessels had turned back when only two days out; another was abandoned at Newfoundland; a third was lost, with nearly 100 men; and Gilbert himself, on the voyage home, went down with one of the remaining two. Raleigh however was not disheartened. Obtaining from Elizabeth an ample patent and the title of lord proprietor over an extensive region, he fitted out two vessels under the command of Philip Amidas and Arthur Barlow, who reached Ocracoke inlet on the shore of North Carolina, July 13, 1584, and after being hospitably entertained by the savages on Roanoke island, and exploring Pamlico and Albemarle sounds, returned to England in September with the most glowing account of their discoveries. Elizabeth, as a memorial of her state of life, called the newly found region Virginia, and conferred upon Raleigh the honor of knighthood, with a lucrative monopoly of wines. Raleigh, now a member of parliament for Devonshire, obtained a bill confirming his patent, raised a company of colonists, and in 1585 sent out under command of Sir Richard Grenville a fleet of 7 vessels with 108 emigrants. The colony landed at Roanoke island about July 1, and Grenville soon afterward returned home with the ships, capturing on his way a rich Spanish prize. In the mean time Raleigh had been appointed seneschal of the [illegible] of Devon and Cornwall and lord ward[illegible] the stannaries, and had obtained a gra[illegible] 12,000 acres of forfeited land in Ireland, [illegible] he sold to Richard Boyle, afterward [illegible] Cork. His favor at court continued to in[illegible] and was even noticed on the stage in [illegible] which gave Elizabeth great offence. [illegible] the multitude he was one of the most [illegible] hated persons in England; and the elde[illegible] Burleigh, advising his son to avoid the [illegible] carriage of Raleigh and the dangerou[illegible] larity of his rival, urged him to "seek [illegible] be Essex and shun to be Raleigh." In [illegible] two parties were sent out to Virginia [illegible] enforcements, but they found the sett[illegible] abandoned. The disheartened colonis[illegible] gone home in Sir Francis Drake's ship, [illegible] fruit of their expedition had been little [illegible] than the introduction into England of [illegible] and potatoes. Banishing the visions of [illegible] and silver mines, in the pursuit of wh[illegible] many of the early American colonies we[illegible] stroyed, Raleigh now determined to fou[illegible] agricultural state, and in April, 1587, de[illegible] ed a considerable body of emigrants with [illegible] wives and families to make a settleme[illegible] Chesapeake bay. He granted them a [illegible] of incorporation, and appointed a mu[illegible] government for "the city of Raleigh," [illegible] ing the administration to John White, w[illegible] assistants. They founded their city not [illegible] bay, but on the site of the former settleme[illegible] Roanoke island, and when their ship re[illegible] sent Gov. White back to England to ex[illegible] reënforcements. But the reënforcements [illegible] came, and two ships which Raleigh se[illegible] with supplies fell into the hands of a Fr[illegible] man-of-war while they were looking for [illegible] Raleigh's means were now exhausted; the E[illegible] lish public were busied with other matters, [illegible] the colonists all perished, in what precise [illegible] ner is not known. Having expended [illegible] in his attempts at colonization, Raleigh in[illegible] formed under his patent a company of "[illegible] chants and adventurers" to continue [illegible] Meanwhile he had exerted himself to assis[illegible] preparations for resisting an expected Sp[illegible] invasion; and when the great armada appe[illegible] in the channel, he hung upon its rear in a ve[illegible] sel of his own, annoying it by quick and un[illegible] pected movements, which resembled, said [illegible] Henry Wotton, "a morrice dance upon [illegible] water." He was in Drake's expedition to re[illegible] Dom Antonio to the throne of Portugal ([illegible] and before his return captured some Spa[illegible] vessels intended for a fresh invasion of Engl[illegible] Visiting Ireland, he saw Edmund Spenser, [illegible] whom he had already contracted a friend[illegible] and brought him to Elizabeth's court to pr[illegible] to her majesty three books of the "Fa[illegible] Queen." He failed to procure for the poor [illegible] the substantial advantages which he cove[illegible] but he himself was loaded with favors. In [illegible] hope of shattering the power of Spain in the West Indies, he collected, mostly at his own xpense, a fleet of 12 vessels, with which he ailed from the west of England. With the ooperation of Frobisher he captured the larest Spanish prize that had ever been brought o an English port, but he seems to have done o more. Soon after this (1592) it was discovered that he had debauched one of the ueen's maids of honor, the daughter of Sir icholas Throgmorton; and though he maried the lady and lived with her happily till his eath, such an offence to her majesty, especially rom one who had been so long her own proessed admirer, was not to be overlooked. Imrisoned for two months and banished from ourt, he employed the period of his disgrace planning an expedition to Guiana in the ope of discovering the golden region of El orado. He set sail with 5 ships in 1595, and eturned the same year, after exploring a coniderable extent of country about the Orinoco nd destroying the Spanish settlement of San osé. His "Discovery of the large, rich, and eautiful Empire of Guiana," in which he pubished an account of this voyage, might almost e styled a spirited work of fiction. In the ollowing year he coöperated with Lord Howrd of Effingham, Lord Thomas Howard, and ssex in the capture of Cadiz, where he was ounded. His only reward was a restoration o the queen's favor. In 1597 he sailed under ssex against the Azores, quarrelled with his ommander, and returned to find the partial ailure of the expedition ascribed by the public o his misconduct. The court however judged ifferently. He had obtained a grant of the anor of Sherborne in Dorsetshire, which he agnificently embellished, was sent with Lord obham on a joint embassy to the Netherands in 1600, and on his return was made govrnor of Jersey. The execution of Essex, which e was supposed to have had an agency in ffecting, added greatly to the public odium ith which he was regarded, and the death f Elizabeth in 1603 proved a final blow to is fortunes. On the accession of James he as stripped of his preferments, forbidden the oyal presence, and shortly afterward arrested n charge of conspiring to place Lady Arabella tuart on the throne. He made an attempt, robably a feigned one, to commit suicide, delaring his persuasion that he was doomed to ll a victim to the arts of his enemies. Conicted on the slightest evidence, after a rancorus speech from Attorney-General Coke, who yled him a "damnable atheist," a "spider of ell," a "viperous traitor," he was reprieved nd sent to the tower, and his estates were iven to Carr, afterward earl of Somerset. uring the 12 years which he passed in confineent he composed his "History of the World" 1614), from the creation to the fall of the acedonian empire, a work greatly superior oth in style and matter to the English historical compositions which had preceded it. uring 5 years of his imprisonment his wife as permitted to bear him company. At last, Villiers having supplanted Somerset in the royal favor, Raleigh bribed the uncles of the new favorite to obtain his release, and he was accordingly liberated in March, 1615, but not pardoned. It has been supposed that the king had an eye to the possible profits of a fresh voyage to Guiana which Raleigh had proposed making, and to which he immediately devoted the remnant of his own and his wife's property. Obtaining from James a commission as admiral of the fleet with ample privileges, he fitted out 14 ships, and reached Guiana with the loss of two, Nov. 12, 1617. Keymis was sent up the Orinoco with 250 men in boats, landed at the Spanish settlement of St. Thomas, and, in defiance of the peaceable instructions of James, killed the governor and set fire to the town. Raleigh's eldest son was killed in the action. Unable either to advance or maintain their position, they retreated in haste to the ships, a Spanish fleet hovering near them, which had been informed of their intended movements. The leader of this unfortunate party committed suicide; many of the sailors mutinied; the ships scattered; and Raleigh landed at Plymouth in July, 1618, completely broken in fortune and reputation. He was immediately arrested, and failing in an attempt, by feigning madness, to escape to France, was committed to the tower. The Spanish ambassador demanded his punishment, and James was not reluctant to grant it. The judges deciding that, being still under judgment of death pronounced in 1603, he could not be tried again, it was resolved to execute the former sentence. From the moment that his fate became certain, the fortitude which had failed him on his arrest returned. On the scaffold he asked for the axe, and feeling the edge observed with a smile: "This is a sharp medicine, but it is a cure for all diseases."—Raleigh was a man of imposing person, dauntless courage, extensive knowledge, and varied accomplishments. His literary productions, beside those already mentioned, include some short poems, "Maxims of State," "The Cabinet Council," "The Sceptic," and "Advice to his Son;" and he is also remembered in the world of letters as the founder of the "Mermaid club." His life has been written by William Oldys, Arthur Cayley (2 vols. 4to., London, 1805), Mrs. A. T. Thomson (8vo., London, 1830), and P. F. Tytler (Edinburgh, 1833). His poems were collected by Sir E. Brydges (London, 1814), his "Miscellaneous Writings" by Dr. Birch (2 vols., 1751), and his "Complete Works" were published at Oxford (8 vols., 1829).

RALLS, a N. E. co. of Mo., separated from Illinois on the N. E. by the Mississippi and intersected by Salt river; area, about 450 sq. m.; pop. in 1860, 8,592, of whom 1,791 were slaves. It has an undulating surface and a generally fertile soil, underlaid by limestone. The productions in 1860 were 495,405 bushels of Indian corn, 61,427 of wheat, 49,608 of oats, 2,201 tons of hay, 20,366 lbs. of wool, and 78,274 of butter. There were 15 churches, and 1,428 pupils attending public schools. Capital, New London.

RALPH, James, an English author, born in Philadelphia, Penn., died in Chiswick, England, in 1762. He was a schoolmaster in Philadelphia, and went to England in company with Benjamin Franklin in 1724. In the first book of the "Dunciad" he is called one of Walpole's gazetteers. In 1728 he published a poem entitled "Night." He wrote "The Fashionable Lady, or Harlequin's Opera," performed in 1730, and altered several old plays. Most of his separate publications were political pamphlets on current topics. He attached himself to the faction of the prince of Wales, and Horace Walpole mentions his having, in June, 1753, "had the good fortune to be bought off from his last journal, 'The Protestor,' for the only paper that he did not write in it." His only political work now remembered is an octavo volume in answer to the duchess of Marlborough's "Account of her Conduct," in which he defended the memory of Queen Mary and Queen Anne. He continued anonymously Guthrie's history, under the title of a "History of England during the Reigns of King William, Queen Anne, and George I."

RAM, Battering. See Battering Ram.

RAMADAN (Arab., a consuming heat), the 9th month of the Mohammedan year, during the whole of which a rigorous fast is commanded by the Koran. No one is allowed food or drink from sunrise until the appearance of the stars; and those who are unable to observe the ordinance on account of sickness, must fast during the month immediately succeeding their recovery. The Moslems compensate themselves for this rigor during the day by feasting at its close, frequently carried to great excess and continued through the whole night; and Ramadan is succeeded by a month of feasting called the Bairam, the two corresponding to the Christian Lent and Easter. (See Bairam.)

RAMBOUILLET, a town of France, in the department of Seine-et-Oise, 32 m. S. W. from Paris; pop. in 1856, 3,022. It is situated in a fine valley, at the S. end of the forest of the same name. It contains a massive chateau, built in the shape of a horse shoe, protected by ditches and flanked with 5 strong towers, in one of which Francis I. breathed his last. It is surrounded by beautiful gardens planned by Le Nôtre and a large park and forest. In the park is a model farm established here by Louis XVI. in 1786, for the improvement of the breed of sheep, which in 1811 received the merinos that had been imported from Spain by Napoleon. The seigneury of Rambouillet was purchased in 1711 by the count of Toulouse, 3d son of Louis XIV. by Mme. de Montespan, and in 1714 was erected into a dukedom. In 1778 it was bought by Louis XVI.

RAMBOUILLET, Hôtel de, the residence of the noble family of Rambouillet, celebrated as the head-quarters of the highest fashio and literary society of Paris during the half of the 17th century. It was situated ly half way between the Palais Royal a Louvre, and was embellished, if not c built, by Catharine de Vivonne, marchi of Rambouillet, who soon made her dra room, known as the *chambre bleue d'Art* the centre of the most refined and brillia ciety of the capital. Here might be see highest among the nobility, as the pr of Condé, Charlotte de Montmorency, w daughter Anne Geneviève de Bourbon, a ward duchess of Longueville, and her so duke d'Enghien, afterward the great Co the most accomplished and virtuous lad the time, who were styled *précieuses*, the tess de la Suze, Mme. d'Aiguillon, M Sablé, Mlle. Scudéry, Mlle. Paulet, Mm Lafayette, and Mme. de Sévigné; and th celebrated wits and authors, including La R foucauld, Balzac, Voiture, Patru, Godea L nage, and St. Evremond. Here Malher poet, was respectfully welcomed in his years; here Corneille read his masterp *Le Cid*, *Horace*, *Cinna*, *Polyeucte*, and oth here Bossuet, scarcely 16 years old and pupil at the college of Navarre, preached first sermon; while Descartes' *Méthode* was received with applause and eagerly disc Such society could not fail to exercise a m influence, and it contributed greatly to th provement of the French language. Du its palmiest days, from 1624 to 1648, it considered the "oracle of good taste;" nicety gradually degenerated into fast ness, and its wit into mannerism and af tion. The *précieuses* fell into such dis that in 1659 Molière, who had just arrive Paris, satirized them in his little comedy *précieuses ridicules*. On the death of the m chioness in 1655, the *réunions* ceased. A interesting account of them was given by Rœderer in his *Mémoires pour servir à l'hi de la société polie en France* (Paris, 1835).

RAMEAU, Jean Philippe, a French mu composer, born in Dijon, Sept. 25, 168 in 1764. He was the son of an organis was educated for the bar; but he had no for any study but music, and at the age of went to Italy as a violinist, returned to P in 1717, and was organist in several churches. He composed anthems, cantatas, and pieces f the organ and the harpsichord, publish *Traité de l'harmonie* (1722) and *Nouveau tème de musique théorique* (1726), and c posed pieces of music for several of Pi light comedies. He wrote the music for V taire's *Samson* (1732) and Pellegrin's *Hip lyte et Aricie* (1733), the second of which w very successful. During the next 30 years he wrote no fewer than 22 operas, now obso and various theoretical works.

RAMILLIES, a village of Belgium, provi of South Brabant, 16 m. S. by E. from Louv pop. 400. It is famous for a victory wo the duke of Marlborough over the French during the war of the Spanish succession. Marshal Villeroy, a favorite of Louis XIV., but the most presumptuous and incapable of his generals, had placed the French army in such a position as to render defeat inevitable. The duke, at the head of the allied forces of the English and the imperialists, attacked him, May 23, 1706, and within a few hours secured a complete triumph. The loss of the French amounted to 5,000 killed or wounded and 15,000 prisoners, while Marlborough lost fewer than 3,000, and was enabled at once to take possession of Antwerp, Brussels, and Ostend.

RAMISSERAM, an island between Ceylon and the continent of India, at the W. extremity of the chain of rocks and sand banks, called Adam's Bridge, that stretch across from Ceylon and separate Palk's bay from the gulf of Manaar. The island is of irregular shape, about 12 m. long and 6 m. broad. The surface is generally low, and there are tracts of considerable extent covered by swamps. It is well watered, and there is a fresh water lake nearly 3 m. in circumference. It has on its E. side a town named Ramisseram, containing about 1,000 houses, and a magnificent pagoda built of immense blocks of granite; its inhabitants are principally Brahmins. The island is looked upon as a place of great sanctity by the Hindoos, and pilgrimages are undertaken to it from the most distant parts of India, the annual number visiting the great pagoda being estimated at 30,000.

RAMMOHUN ROY, rajah, a Hindoo scholar and reformer, born in the district of Burdwan, Bengal, about 1774, died near Bristol, England, Sept. 27, 1833. His family were strict Brahmins, but having studied the Koran he early renounced polytheism, and his father was compelled to withdraw his countenance from him, though he contributed secretly to his support. In 1803, after the death of his father, Rammohun Roy published several pamphlets in the native and foreign languages, to show that the Brahmins had fallen away from their original faith, for which an unsuccessful attempt was made to deprive him of caste. He translated into Bengalee and Hindostanee the Vedanta, or body of Hindoo theology as contained in the Vedas, afterward prepared an abridgment of it, and in 1816 translated the abridgment into English. In conjunction with two other natives he published the "Bengal Herald," an English newspaper, and in 1820 published in English, Sanscrit, and Bengalee a series of selections from the New Testament, entitled "The Precepts of Jesus the Guide to Peace and Happiness." In this he advanced Unitarian opinions which involved him for several years in controversy with Dr. Marshman and other missionaries. He believed in the divine mission of Christ, and considered Christianity consistent with Brahminism as it is in the ancient Sanscrit authorities. In 1830 he was accredited to the British court by the king of Delhi, to make a representation of grievances; and though not recognized officially, he was successful in his mission.

RAMORINO, Gerolamo, a military adventurer, born in Genoa in 1792, executed in Turin, May 22, 1849. He was a natural son of the French marshal Lannes, entered the ranks of the French army, and in the campaign of 1809 against Austria served as a common soldier, and in that of 1812 against Russia as captain of artillery. In 1815 the emperor appointed him officer of ordnance, and after the second restoration he retired to Savoy. During the insurrection which broke out in Piedmont in 1821, he along with the count of Santa Rosa placed himself at the head of the insurgent troops, and by a dexterous retreat from Casale to Alessandria saved them from being destroyed by the Austrians. After the failure of the movement he fled to France, and at the beginning of the Polish insurrection of 1830 hastened to Warsaw to offer his services. He was first made colonel, and then general of a corps with which he gained numerous advantages, and his success alone saved him from the condemnation of a court martial on account of his frequent disobedience of orders. After the fall of Warsaw he retired to the upper Vistula, refused the Russian summons to surrender, but finally crossed the frontier and laid down his arms in Galicia, whence he went to France. For a short time he served in the Spanish civil war, and in 1833-'4 engaged in the invasion of Savoy planned by Mazzini. After the failure of this expedition (see Mazzini) he went to Paris, where he lived in poverty and isolation until 1848, when he went to Italy to serve against Austria. At the beginning of Charles Albert's second campaign, in the following year, Chrzanowski placed him at the head of the 5th division, with orders to occupy a position on the right bank of the Po, and, should the enemy advance from Pavia, to cross the river and prevent his march. Ramorino, mistaking the design of the Austrians, commanded by Radetzky, acted directly contrary to his orders, and left the left bank of the Po undefended and the direct road from Pavia to Turin open. The fatal issue of the battle of Novara, March 23, 1849, was the consequence. For this conduct he was deprived of his command, and was suspected of treason. He retired to Borgomanero, which he believed or affected to believe was the head-quarters of the Sardinian army, but was arrested at Arona by the national guards, tried before a court martial on a charge of insubordination, and sentenced to death. He justified his course on the ground of the feebleness of his division, 6,000 strong, which rendered it impossible for him to resist the advance of the Austrian army. The sentence was carried into execution, although he stoutly maintained his innocence and died bravely.

RAMSAY, Allan, a Scottish poet, born in Leadhills, Lanarkshire, Oct. 15, 1686, died in Edinburgh, Jan. 7, 1758. His father, who was manager of the lead mines of Lord Hopetoun, claimed descent from the earls of Dalhousie, and collateral relationship with the Douglases, a circumstance referred to with considerable complacency by his son in various passages of his writings. Allan is said to have been employed when a child as a washer of ore, but he acquired a tolerable education at the village school of Leadhills, where he learned, among other things, to read Horace "faintly in the original." At the age of 15 he was apprenticed to a wig maker in Edinburgh, an employment in which he continued for several years after the expiration of his apprenticeship. His poetic talent did not develop itself until he was about 26 years old, and his first production in verse was an address "To the most happy Members of the Easy Club," a convivial association of Jacobites. As poet laureate of the club he produced a number of light and humorous pieces for their edification; and he subsequently published on single or half sheets many poems on local or familiar topics, which at the moderate price of a penny each found a ready sale among the citizens of Edinburgh, who were in the habit of sending their children with a penny for "Allan Ramsay's last piece." His first poem of considerable length was a continuation of King James's "Christ's Kirk on the Green," published in 1716, and of which in 1718 he published a second edition with an additional canto. A short time previous to the latter date he exchanged his employment of peruke making for the more congenial one of bookseller, and at the Mercury opposite to the head of Niddry's wynd he prosecuted his business, which included that of author and editor, with industry and success. In 1720 appeared a 4to. edition of his collected poems, which brought the author the very considerable sum of £400. Incited by this success, Ramsay produced in the course of the next few years a volume of "Fables and Tales," the "Fair Assembly," "Health," a poem inscribed to the earl of Stair, and the "Tea Table Miscellany," a collection of songs, Scottish and English, with many of his own composition, which was extended to 4 volumes. This was suggested by a volume of Scottish songs published by him in 1719, and was in such demand that in a comparatively short time it ran through 12 editions. In 1724 he also published "The Evergreen, being a Collection of Scots Poems wrote by the Ingenious before 1600," into which is introduced a poem by himself entitled the "Vision," a Jacobite allegory. His most important work was "The Gentle Shepherd" (1725), portions of which had appeared in his first volume of poems. He now removed his business to a larger shop, which soon became the resort of the wits and literary men of Edinburgh, and in which he established the first circulating library ever opened in Scotland. In an evil hour he was tempted into building at great expense a theatre, an enterprise which failed through the action of the magistrates, who enforced against him the act for licensing theatrical performances. By careful attention to his business he repaired his losses, and when near his 60th year built a house on the Castle hill, in which he passed the remainder of his life in easy circumstances. In 1728 he published by subscription a second volume of his poems in quarto (including "The Gentle Shepherd"), which proved equally successful with the first; and his entire poems were republished in London in 1731 and in Dublin in 1733. His last original work of importance was a collection of fables published in 1730. A complete edition of his poems, with a biography by George Chalmers, was published in 2 vols. 8vo. in 1800, and "The Gentle Shepherd" is frequently republished. A very correct edition was printed by W. Gowans (New York, 1854).—Allan, son of the preceding, a portrait painter, born in Edinburgh in 1713, died in Dover, Aug. 10, 1784. He was a man of literary culture, settled in London, and was a frequent visitor at the house of Dr. Johnson. Though raised by political partisanship to a momentary rivalry with Sir J. Reynolds, his works are not above mediocrity.

RAMSAY, Andrew Michael, better known by the name of the chevalier de Ramsay, a Scottish author, born in Ayr, June 9, 1686, died in St. Germain-en-Laye, France, May 6, 1743. He was educated at the university of Edinburgh, and in his 23d year, becoming unsettled in his religous convictions, he repaired to the university of Leyden to consult Poiret, a leading advocate of the mystical theology then popular on the continent. He next visited Fénélon at Cambray, and during a 6 months' residence in the house of the archbishop was by him converted to the doctrines of the Roman Catholic church, which he ever afterward professed. He mastered the French language, which he wrote with great purity, and through the exertions of Fénélon was appointed tutor to the duke of Château-Thierry and afterward to the prince de Turenne. Subsequently he had charge for a year at Rome of the education of the two sons of the pretender, Charles Edward and Henry, afterward Cardinal York. He revisited Scotland in 1725, and for several years was an inmate of the family of the duke of Argyle, and in 1730 he received the degree of LL.D. from Oxford university. His largest work is "On the Principles of Natural and Revealed Religion," published posthumously in 1749 (2 vols. 4to., Glasgow). His *Voyages de Cyrus*, by which he is best known, is a palpable imitation of the *Télémaque* of Fénélon. It has been frequently reprinted, the best edition in French being that of 1727 (2 vols. 8vo., Paris and London), and was translated by Nathaniel Hooke. He also wrote a biography of his friend and benefactor, Fénélon (the Hague, 1723), and one of Marshal Turenne, both of which were translated and republished in England. His renunciation of the Presbyterian creed, in which he had been strictly reared, severed completely his relations with his family, who refused to receive an annuity which he wished to settle on them; and it is said that his father, an old-fashioned Covenanter, indignantly declined a present of money from his son, exclaiming: "It cam' by the beast, and let it gang to the beast."

RAMSAY, DAVID, an American physician and historian, born in Lancaster co., Penn., April 2, 1749, assassinated in Charleston, S. C., May 8, 1815. He was graduated at Princeton college in 1765, studied medicine in Philadelphia, and in 1772 commenced practice in Maryland, whence in the succeeding year he removed to Charleston, S. C. He took the field as a surgeon at the outbreak of the revolution, was a member of the South Carolina legislature, and of the privy council or council of safety, and in the latter capacity became so obnoxious to the British authorities, that after the capture of Charleston he was included among the 40 inhabitants of that place who were held in close confinement at St. Augustine as hostages. In 1782 he was elected to congress from the Charleston district, and held for a year the office of president of that body. In 1785 he published his "History of the Revolution in South Carolina," and in 1789 his "History of the American Revolution." Both were republished in Europe, and were translated into French. In 1801 he published a "Life of Washington," and in 1809 a "History of South Carolina" (2 vols. 8vo.), founded upon a previous "Sketch of the Soil, Climate, Weather, and Diseases of South Carolina." His next production was a "History of the United States," from their settlement as English colonies to the close of 1808, which was published posthumously, with a continuation to the treaty of Ghent, prepared by the Rev. Samuel Stanhope Smith, in 1817 (3 vols. 8vo.). Another work upon a more comprehensive plan, which had engaged his attention at intervals during a period of nearly 40 years, was published in 1819 under the title of "Universal History Americanized" (12 vols. 8vo.). It purported to give a historical view of the world from the earliest records to the 19th century. Apart from his literary labors, he practised his profession with success in Charleston, and was engaged in many public proceedings of importance. He seldom devoted more than 4 hours out of the 24 to sleep; but notwithstanding this small allowance of time for rest, his health was vigorous. He was shot in the street by a lunatic, of whose mental unsoundness he had given evidence before a commission *de lunatico inquirendo.*

RAMSAY, EDWARD BANNERMAN, a Scottish author, born in 1793, was graduated at St. John's college, Cambridge, became incumbent of St. John's church in Edinburgh in 1830, and was appointed dean of the diocese in 1846. He is author of "Reminiscences of Scottish Life and Character" (Edinburgh, 1858), which passed through 8 editions in 2 years, beside 2 in America; a second series appeared in 1861. He has also written several theological and devotional works, as "Diversities of Christian Character" (Edinburgh, 1858), "Advent Sermons," &c.

RAMSDEN, JESSE, an English maker of philosophical instruments, born near Halifax, Yorkshire, in 1735, died in 1800. He first served an apprenticeship to a cloth dresser in Halifax, but his mathematical tastes led him afterward to bind himself to an instrument maker, and he early opened a shop of his own in London. He improved the construction of the sextant so as to reduce the limit of error from 5' to 30". The telescopes erected by him at the observatories of Blenheim, Mannheim, Dublin, Paris, and Gotha were remarkable for the superiority of their object glasses; and in his mural quadrants furnished to the observatories of Padua and Wilna, it was not possible to detect an error amounting to 2½ seconds. One of his most celebrated productions was a dividing machine of great perfection. (See DIVIDING ENGINE.) By his will a large portion of his fortune was distributed among the workmen whom he had employed.

RAMSEY, an E. co. of Minn., bordered S. W. and partly N. by the Mississippi, and drained by Rum river; area, about 2,800 sq. m.; pop. in 1860, 12,150. It has an elevated surface, with prairies and forests. Capital, St. Paul.

RAMSGATE, a seaport town of Kent, England, situated at the S. E. corner of the isle of Thanet, 67 m. E. from London; pop. in 1861, 11,838. The harbor is artificial, and nearly circular, comprising an area of 46 acres, and including a dry dock and ship railway. Ship building and rope making are carried on. Ramsgate is a dependency of Sandwich, and a fashionable watering place.

RAMUS, PETER (PIERRE DE LA RAMÉE), a French grammarian and logician, born in Cuth, Picardy, in 1502 or 1515, killed in the massacre of St. Bartholomew's day at Paris, Aug. 24, 1572. He was born of poor parents, and at the age of 12 entered the college of Navarre at Paris as a servant, spending the day in labor and a good part of the night in study. He made rapid progress, and conceived a great love for logic with a profound contempt for the way in which it was taught. When his course was finished, and he presented himself for examination for the degree of master of arts in 1536, he chose for his exercise the following subject: *Quæcunque ab Aristotele dicta essent commentitia esse* ("All that has been affirmed by Aristotle is a fabrication"). So bold a denial of the infallibility of Aristotle startled the judges, but the young candidate maintained his side with so much skill, that he was admitted to his degree. He afterward taught in the college of Ave Maria, and when about 28 years old published two works in Latin entitled respectively *Dialecticæ Partitiones ad Academiam Parisiensem*, and *Animadversiones in Dialecticam Aristotelis*. These books had scarcely appeared when they were attacked by the officers of the university of Paris, and an order for their suppression was obtained from the magistrates. The author was represented as impious and seditious, and as aiming to destroy all science and religion under the pretence of assailing Aristotle. The quarrel between the rival systems of logic was at last settled by the king, Francis I., who ordered a trial in which two of the judges were to be nominated by Ramus, two by Govea, his chief accuser, and one by the king. After a regular, though it is charged an unfair hearing, Ramus, on March 1, 1544, was condemned as having "acted rashly, arrogantly, and impudently," and was prohibited from teaching and his book suppressed. Soon after he lectured on rhetoric at the college of Presles, and in 1545 returned to Paris, where by the influence of the cardinal of Lorraine the royal prohibitory decree had been cancelled. Turning his attention to mathematics, he began a course, which was continued until 1551, when Henry II. appointed him professor of philosophy and eloquence in the college of France. During the 10 following years, which were the most tranquil of his life, he published a Greek, a Latin, and a French grammar, and treatises on mathematics, logic, and rhetoric. In 1561 he embraced Protestantism, and advocated his opinions with great zeal. In July, 1562, he was forced to flee, but was offered by Charles IX. a refuge at the palace of Fontainebleau, while his own house was pillaged and his library destroyed. In 1563, after the treaty of Amboise, he returned to Paris, and for a time occupied his professor's chair; but in 1568 he received permission to travel on account of the civil troubles. In Heidelberg he lectured on mathematics, and in Geneva and Lausanne on logic. His assassination on the night of St. Bartholomew was effected through the agency of one Jacques Charpentier, whose appointment to the chair of mathematics in the university he had opposed. His followers were called Ramists or Rameans. A catalogue of his works may be found in *Ramus, sa vie, ses écrits et ses opinions*, by Waddington-Kastus (8vo., Paris, 1855).

RAMUSIO, Giambattista, an Italian traveller and scholar, born in Treviso in 1485, died in 1557. He held many offices under the republic of Venice, was secretary of the council of ten, and travelled as an ambassador through France, Switzerland, and Italy. In 1550 he began to publish, under the title of *Raccolta di navigazioni e viaggi*, a collection of the most important voyages and travels to distant countries in ancient and modern times, which is of value to the American historian, as it possesses some relations of discovery and conquest of the new world, not elsewhere extant. Two volumes were published during his lifetime and a third after his death.

RANCÉ, Armand Jean Le Bouthillier de, the reformer of the monastery of La Trappe, born in Paris, Jan. 9, 1626, died Oct. 26, 1700. He was a godson of Cardinal Richelieu, and at the age of 12 published an edition of Anacreon, with notes and comments. Though a priest in 1651, he led a rather dissipated life, was an assiduous visitor at the Hôtel de Rambouillet, where he fell in love with the duchess of Montbazon. On her death some years [illegible] he turned his thoughts to religion, submitting himself to severe penances, gave all his property to the poor, and resigned all his benefices except the abbey of La Trappe, to which [illegible] retired in 1662. The disorders that prevailed here strongly impressed him with the necessity of a reform in monastic life, and he [illegible] twice to Rome in 1665 to obtain from the [illegible] permission to enforce in France the rule of the former "strict observance of Cîteaux." He failed in his mission, but nevertheless introduced the most rigorous regulations [illegible] his own community, and brought it back [illegible] its original severity. Rancé's doctrines were denounced, and in 1673 arbiters were appointed by the king, who came to no decision. In [illegible] he published a treatise *De la sainteté et des devoirs de la vie monastique*, and in 1690 assumed the spiritual direction of the convent of Les Clairets, a female community dependent [illegible] that of La Trappe, and composed his *Réflexions sur les quatre évangélistes*. In 1695, having brought on a severe disease by his austerities, he resigned his abbacy and remained a private monk in the convent, redoubling his penances, and finally breathing his last upon a bed of straw and ashes. His life was written by his contemporaries Maupeau, Marsollier, and Lenain de Tillemont, by Châteaubriand (Paris, 1844), and by C. Butler (London, 1814).

RANDOLPH, the name of counties in [illegible] the United States. I. A N. co. of Va., drained by the sources of the Monongahela river; area about 2,000 sq. m.; pop. in 1860, 4,990, of whom 183 were slaves. The surface is mountainous, a range of the Alleghanies running along its E. border, and several parallel ranges extending within its limits; the soil in the valleys is fertile. Coal, iron, salt, limestone, and other minerals abound. The productions in 1850 were 11,740 bushels of wheat, 87,46[illegible] of Indian corn, 44,789 of oats, 6,480 tons of hay, 1,844 lbs. of tobacco, 18,895 of wool, and [illegible] 889 of butter. There were 10 churches, and 880 pupils attending public schools. Value of real estate in 1856, $1,287,652, showing an increase since 1850 of 14 per cent. Capital, Beverly. II. A central co. of N. C., drained by Deep river and branches of the Yadkin; area, about 900 sq. m.; pop. in 1860, 16,7[illegible] of whom 1,645 were slaves. It has a diversified surface and fertile soil. The productions in 1850 were 83,364 bushels of wheat, 440,0[illegible] of Indian corn, 38 bales of cotton, and 1,915 lbs. of tobacco. There were 20 grist mills, a woollen factory, 5 cotton factories, 5 tanneries, 1 newspaper office, 49 churches, and 1,550 pupils attending public schools. Capital, Ashborough. III. A S. W. co. of Ga., separated from Alabama by the Chattahoochee, intersected by Pataula creek, and drained by branches of Flint river; area, about 700 sq. m.; pop. in 1860, 9,571, of whom 4,467 were slaves. It has a nearly level surface, and a very fertile soil in the river bottoms. The productions in 1850 were 454,583 bushels of Indian corn, 151,189 of sweet potatoes, 56,959 of oats, and 10,582 bales of cotton. There were 8 grist mills, 12 saw mills, 2 tanneries, 44 churches, and 715 pupils attending public schools. Capital, Cuthbert. IV. An E. co. of Ala., bordering on Georgia, intersected by the Tallapoosa river; area, about 600 sq. m.; pop. in 1860, 20,059, of whom 1,904 were slaves. It has an uneven surface and a generally fertile soil. Gold is found in the county. The productions in 1850 were 319,169 bushels of Indian corn, 60,820 of sweet potatoes, 7,185 lbs. of rice, and 1,056 bales of cotton. There were 40 churches, and 1,229 pupils attending public schools. Capital, McDonald. V. A N. E. co. of Ark., bordering on Missouri, and drained by Eleven Point, Big Black, Little Black, and Cache rivers, branches of Black river; area, about 850 sq. m.; pop. in 1860, 6,261, of whom 359 were slaves. Its surface is generally level and the soil fertile. The productions in 1854 were 202,018 bushels of Indian corn, 5,723 of wheat, 10,842 of oats, and 275 bales of cotton. In 1850 there were 8 grist mills, 10 saw mills, a woollen factory, and 3 tanneries. Capital, Pocahontas. VI. An E. co. of Ind., bordering on Ohio, and drained by White, Mississinewa, and Whitewater rivers; area, about 460 sq. m.; pop. in 1860, 19,016. It has an undulating surface and fertile soil. The productions in 1850 were 536,107 bushels of Indian corn, 67,048 of wheat, 75,290 of oats, 60,125 lbs. of wool, and 7,261 tons of hay. There were 32 churches. It is intersected by the Bellefontaine railroad line, which passes through the capital, Winchester. VII. A S. W. co. of Ill., separated from Missouri by the Mississippi river, intersected by the Kaskaskia, and drained by various small streams; area, about 500 sq. m.; pop. in 1860, 17,205. It has an undulating and hilly surface and a generally fertile soil. The productions in 1850 were 443,491 bushels of Indian corn, 60,914 of wheat, 125,130 of oats, 1,296 tons of hay, and 17,781 lbs. of wool. There were 12 saw mills, 2 tanneries, 3 newspaper offices, 24 churches, and 1,414 pupils attending public schools. Capital, Chester. VIII. A N. co. of Mo., intersected by the East fork of Chariton river and drained by Silver creek, the Elk fork of Salt river, and the head waters of Bonne Femme river; area, about 450 sq. m.; pop. in 1860, 11,406, of whom 2,619 were slaves. It has a nearly level surface and very fertile soil. The productions in 1850 were 668,105 bushels of Indian corn, 60,914 of wheat, 125,130 of oats, 2,263,796 lbs. of tobacco, 38,309 of wool, and 158,768 of butter. There were 9 saw mills, 6 tanneries, 14 churches, and 607 pupils attending public schools. The capital, Huntsville, is situated 78 m. N. W. of Jefferson City.

RANDOLPH, John, of Roanoke, an American statesman, born at Cawsons, Chesterfield co., Va., June 2, 1773, died in Philadelphia, June 24, 1833. His parents were of ancient and wealthy families, and on his father's side he was descended from Pocahontas the Indian princess—a descent in which he always took great pride. His early education was conducted at home, but about his 16th year he spent a few months in study at Princeton, and at Columbia college, New York. He studied law at Philadelphia, but never engaged in the practice of the profession. In 1799 he was elected a representative in congress, and soon became conspicuous, in the language of the historian Hildreth, as "a singular mixture of the aristocrat and the Jacobin: an aristocrat by birth, education, and temperament; a Jacobin at this time out of enthusiasm for France, and during all his life out of a sort of Ishmaelitish opposition to the exercise of authority by anybody but himself." In a debate, Jan. 10, 1800, on the army bill, he spoke of the officers of the army and navy as "a handful of ragamuffins," and was in consequence insulted at the theatre a few nights afterward by some young military officers. He wrote next day a violent letter to the president demanding the punishment of the offenders. The president referred the matter to congress, and an investigation was ordered, which resulted only in severe censure by a committee of Randolph's letter. He was reelected in the following year, and, there being a republican majority in the house, was made chairman of the committee of ways and means, in which position his fluency, skill at retort, and acrimonious wit made him the acknowledged leader in debate of the administration party. In 1806, however, he quarrelled with the administration and assailed President Jefferson and his supporters with great virulence. He also attacked Madison's administration, and opposed vigorously the declaration of war against Great Britain in 1812. His opposition caused his defeat at the next election, and he retired from the house, of which he had been a member for 12 years. He was, however, reelected in 1814 and again in 1818, having declined to be a candidate in 1816. In the congress of 1819–'20 he vehemently opposed the Missouri compromise, stigmatizing the northern members by whose coöperation it was carried as "doughfaces," an epithet at once adopted into the political vocabulary of the United States, and still in use. In 1822, and again in 1824, he visited England, where his eccentricities and strange figure and costume attracted considerable attention. From 1825 to 1827 he was a senator of the United States. He supported Mr. Crawford for president in 1824, and Gen. Jackson in 1828. In 1829 he was a member of the convention to revise the constitution of Virginia, and in the following year was appointed minister to Russia, an office which he accepted on condition that he might spend the winter in the south of Europe, as his health, which for some years had been seriously impaired, was now exceedingly feeble. Soon after his reception by the emperor, he departed abruptly for England, where he remained for nearly a year, and returned home without revisiting Russia. His district again elected him to congress, but he was too ill to take his seat. Exhausted with consumption, he died in a hotel at Philadelphia, whither he had gone on his way to take passage again across the ocean. —During his life Mr. Randolph's speeches were more fully reported and more generally read than those of any other member of congress. In the house he was always listened to with intense interest, and the force of his eloquence was heightened by his personal appearance, which was singularly striking. He was tall and very slender and cadaverous, with long, skinny fingers, which he was in the habit of pointing and shaking expressively at those against whom he spoke. His voice was shrill and piping, but under perfect command and musical in its lower tones. His favorite weapons in debate were invective and sarcasm, and for many years his sharp and reckless wit made him a terror to his opponents in the house. "For more than 30 years," says Mr. Benton, "he was the political meteor of congress, blazing with undiminished splendor during the whole time, and often appearing as the 'planetary plague' which shed, not war and pestilence on nations, but agony and fear on members. Wit and genius all allowed him; sagacity was a quality of his mind visible to all observers, and which gave him an intuitive insight into the effect of measures. He was long the chairman of the committee of ways and means—a place always of labor and responsibility, and of more then than now when the elements of revenue were less abundant; and no man could have been placed in that situation during Mr. Jefferson's time whose known sagacity was not a pledge for the safety of his lead in the most sudden and critical circumstances. He was one of those whom that eminent statesman habitually consulted during the period of their friendship, and to whom he carefully communicated his plans before they were given to the public." Randolph was one of the largest slaveholders of Virginia, and at the time of his death possessed 318 slaves, whom by his will he manumitted, at the same time bequeathing funds for their settlement and maintenance in a free state. In 1803, as chairman of the committee upon a memorial from Indiana asking for permission to introduce slaves into that territory in spite of the prohibition of the ordinance of 1787, he reported adversely to the petition on the ground that the ordinance was "wisely calculated to promote the happiness and prosperity of the north-western country." —See "Life of John Randolph," by Hugh A. Garland (2 vols. 8vo., New York, 1850).

RANDOLPH, Peyton, an American patriot, president of the first congress, born in Virginia in 1723, died in Philadelphia, Oct. 22, 1775. He was the second son of Sir John Randolph, and after having been graduated at the college of William and Mary, he was sent, like young men of the aristocracy, to complete education in England, and studied law at the Temple. In 1748 he was appointed king's attorney for the colony, and the same year chosen a member of the house of burgesses for the city of Williamsburg. During that session he was made chairman of a committee authorized to prepare a general revisal of the laws of the colony, and from this time continued one of the most active and influential members of the assembly. In 1752 Lieut. Gov. Dinwiddie came into conflict with the Virginia house of burgesses by imposing a fee equivalent to [illegible] for every seal annexed to a grant of land. Randolph was sent by that body as their agent to England to procure redress for their grievances, but was unsuccessful in his mission. In 1755, after the defeat of Braddock, he and [illegible] other gentlemen formed a regiment for the purpose of joining at the frontier the colonial force under Washington; but as the enemy retreated to Fort Duquesne, no engagement took place. In 1764 the Virginia house of burgesses voted an address to the king against the passage of the stamp act, and Randolph drew it up. When in 1765 that act became a law, Patrick Henry moved on May 30 his celebrated 5 resolutions, which Randolph strongly opposed, not however on any question of our rights, "but on the ground," says Jefferson, "that the same sentiments had been at the preceding session expressed in a more conciliatory form, to which the answers were not yet received." (See Henry, Patrick.) When in the same year congress met at New York, and Virginia was prevented by her governor from sending deputies, the assembly of that state forwarded to England petitions of a character similar to those adopted by the congress. The address to the king was written by Randolph. On April 1[illegible] 1766, on the death of Speaker Robinson, Randolph was made speaker of the house of burgesses, resigning about the same time his office of attorney-general. In the measures of opposition to the English government he now took a conspicuous part. In March, 1773, on the reception of copies of an address and resolutions from the Massachusetts assembly, Randolph was one of the most prominent in urging instant and bold action. A committee of vigilance was appointed, of which he was one, to obtain the most accurate and clear intelligence of all acts of parliament affecting the rights of the colonies; and it was also authorized to open a correspondence with the other colonies. In the convention which met in Aug. 1774 at Williamsburg, Randolph presided, and was one of the delegates elected to the continental congress appointed to meet in Philadelphia in the following September. On the assembling of that body he was unanimously elected its president, but in consequence of ill health held that position only 5 or 6 weeks. In 1775 he presided over the second convention of Virinia, which assembled at Richmond on March 0, and was elected again as a delegate to congress, with the substitution of Jefferson in his place in case of his non-attendance. That body met at Philadelphia on May 10, 1775, and Randolph was reëlected president; but finding it necessary to return to Virginia to resume the duties of speaker of the house of burgesses, he was succeeded in his office by John Hancock. He died suddenly of apoplexy. He was a man of excellent judgment, though without genius, of imposing presence, incorruptible integrity, and extremely intolerant to religious dissenters. He was buried in the chapel of William and Mary.

RANGOON, the commercial capital of Pegu, situated on the left bank of the E. branch of the Irrawaddy, about 25 m. from the sea, in lat. 16° 47′ N., long. 96° 18′ E.; pop. 20,000. About 2 m. below the town the river divides into two arms, both of which are navigable, but the W. branch, called the Rangoon river, is generally preferred. The town extends about a mile along the river, and the streets are narrow but clean and well paved. The houses are raised on posts, but there are a few built of brick, chiefly belonging to Europeans, and since its occupation by the British the place has been fortified. There are some curious Buddhist pagodas and monuments. Rangoon was built in 1755, when the Burmese conquered Pegu. It is well suited for ship building, as the tide rises from 16 to 24 feet, and a large quantity of teak timber is floated down the Irrawaddy. In Jan. 1852, Rangoon was taken by the British. In 1853 it suffered from a severe fire which burned a great part of the town; and again in 1856 it was almost destroyed by fire.

RANKE, Leopold, a German historian, born in Wiehe, near Naumburg, Dec. 21, 1795. In 1818 he became principal teacher of the gymnasium of Frankfort-on-the-Oder, but occupied himself chiefly with historical studies. In 1824 appeared at Berlin the 1st volume of his *Geschichte der Romanische und Germanische Völker* von 1494–1535. He was in 1825 made professor of history in Berlin, and soon after was sent by the Prussian government to Vienna, Venice, Rome, and Florence, to search for historical materials in the archives of those cities. The results of his labors were first made manifest in a work entitled *Fürsten und Völker von Süd-europa im 16ten und 17ten Jahrhundert* (1827). In 1829 he published *Die Serbische Revolution*, in 1831 *Ueber die Verschwörung zu Venedig*, and in 1834 *Vorlesungen zur Geschichte der Italienische Poesie*. His work entitled *Die Römischen Päpste, ihre Kirche und ihr Staat* ("The Popes of Rome, their Church and State," 3 vols., Berlin, 1834–'6) has been three times translated into English: by Mrs. Austin in 1840; by Scott, with an introductory essay by Merle D'Aubigné, in 1846; and by E. Foster in 1848; in 1832 he began the *Historisch-politische Zeitschrift* (vol. i., Hamburg, 1832; vol. ii., Berlin, 1833–'6), which being decried as illiberal was discontinued in 1836. His next work was *Deutsche Geschichte im Zeitalter der Reformation* ("History of Germany in the Time of the Reformation," 6 vols., Berlin, 1839–'47), in which he gave an account of the rise of Protestantism. This work, which has also been translated into English by Mrs. Austin, is considered his best. It was followed by *Neun Bücher Preussischer Geschichten* (3 vols., Berlin, 1847–'8), for aid in writing which the Prussian archives were for the first time opened. This work has been translated by Sir A. and Lady Duff Gordon, under the title of "Memoirs of the House of Brandenburg, and History of Prussia during the 17th and 18th Centuries." Turning his attention to French history, he wrote *Französische Geschichte vornehmlich im 16ten und 17ten Jahrhundert* (3 vols., Stuttgart, 1852–'5), which contains an account of Protestant struggles in that country. Beside these he has written *Jahrbücher des Deutschen Reichs unter dem Sächsischen Hause* (3 vols., Berlin, 1837–'40), and several other historical works.

RANKIN, a central co. of Miss., bordered W. and N. W. by the Pearl river and drained by its branches; area, about 800 sq. m.; pop. in 1860, 13,637, of whom 7,105 were slaves. Its surface is covered with pine forests, and its soil is generally fertile. The productions in 1850 were 217,673 bushels of Indian corn, 68,206 of sweet potatoes, 66,105 lbs. of rice, and 2,675 bales of cotton. There were 15 churches, and 340 pupils attending public schools. It is intersected by the southern Mississippi railroad, which passes through the capital, Brandon.

RANTOUL, Robert, jr., an American statesman, born in Beverly, Mass., May 13, 1805, died in Washington, D. C., Aug. 7, 1852. His father, who survived him for several years, was long a member of the state legislature. The son was educated at Phillips academy, Andover, and at Harvard college, where he was graduated in 1826. He studied law with John Pickering in Salem, was admitted to the Essex bar in 1827, and for several years practised in Gloucester, from which town he was in 1834 and in 3 succeeding years elected a member of the legislature, where he distinguished himself as a reformer and as an advocate of the rights and interests of the common people. He exerted himself for the abolition of capital punishment, and made a report to the legislature on that subject, which is still one of the standard authorities of the opponents of the practice. In 1837 he was appointed a member of the Massachusetts board of education, and gave much time and attention to the advancement of the system of public instruction. In 1843 the president appointed him collector of the port of Boston, and in 1845 he was made U. S. district attorney. In 1851 he was elected U. S. senator to succeed Daniel Webster for the short remainder of his term; and in the same year, having taken his position prominently among the opponents of the extension of slavery, the freesoilers of his district united with the democrats in electing him to the U. S. house of representatives, of which he was a member at the time of his sudden death. A volume of his speeches and writings, with a memoir, was published in Boston in 1854.

RANUNCULUS (Lat., a little frog), the botanical name of certain herbaceous plants with more or less divided leaves and showy flowers, which grow in places frequented by the frog. The ranunculi are either perennial or annual, with mostly radical leaves, and flowers either solitary or somewhat corymbed, the prevalent color yellow, though sometimes white; the calyx has 5 sepals, and the corolla 5 petals, with a scale or pit inside each petal at base; the stamens are numerous; the fruit (*achenes*) many, compressed, ovate, pointed, and disposed in roundish or cylindrical heads. They bear the names of spearworts, crowfoots, buttercups, kingcups, and the like, in reference to the form of the foliage or the bright hue and shape of the blossoms. The ranunculus is the type of the natural order *ranunculaceæ*, which embraces herbs, woody vines, and subshrubby plants, all conspicuous for the beauty of their flowers and the acridity of their juices, found growing for the most part in northern frigid and temperate regions. The number of species of ranunculus, according to Persoon's *Synopsis* in 1807, is 85; but in the *Hortus Britannicus*, published in 1830, there are 95 enumerated; the number found in the United States alone, according to Torrey and Gray's "Flora of North America," is 44, including a few that are considered doubtful; several are regarded as adventitious from Europe. A few are remarkable for beauty, such as the alpine crowfoot (*R. alpestris*, Linn.), a little plant 3 to 8 inches high, with thickened fibrous roots, smooth leaves with 3 to 5 lobes, flower stems either solitary or several; flowers 1 or 2 at the summit, white; petals recurved, heart-shaped. It is found on the highest summits of the Austrian Alps, and on the Jura, blooming in June and July. The fair maids of France (*R. aconitifolius*, Linn.) is of a different style, having a stem 2 or 3 feet high, palmipartite, toothed, and incised leaves, and white blossoms of 5 or 6 petals and pubescent sepals. There is a multiplex-petalled variety much cultivated in Europe, under the above fanciful name, as a choice border perennial; and another variety is known in the wild state, in which the leaves differ permanently in their shape. Several aquatic species with finely cut leaves have very pretty white flowers, which rise just above the surface of the water. But perhaps the most remarkable of all the crowfoots is the common garden ranunculus (*R. Asiaticus*, Willd.), from the fact that it is the original type and parent of innumerable superb forms with double and multiplex-petalled flowers of every shade and hue. This species, indigenous to the Levant, is a low plant with ternate or biternate radical leaves, an erect, simple or branched flower stalk, variously colored, 5-petalled flowers, and a cylindrical spiked fruit. Maddock, a celebrated florist, enumerates 800 sorts with proper names and ranged in groups according to their several colors, as purple, gray, crimson, red, rosy, orange, yellow, white. These have some characteristic mark by which they are known, and were produced by sowing the seeds of the finest semi-double varieties. Whatever is the parent plant, none of its offspring, however numerous, resemble it. Thus an endless variety can be expected, and out of a large number only the very best are selected. To increase these, the roots are carefully divided, each division flowering in the second year. There are two distinct sorts known as the Turkey and the Persian, both of which require a rich loamy soil that is well manured. They are planted in the autumn, by placing their small, forked, tuberous roots 6 or 8 inches apart in beds of soil free from stones, it being found that stronger blossoming is thereby secured.—Three species of ranunculus, known as buttercups or kingcups, adventitious from Europe, are common weeds in our pastures, fields, and meadows. They are conspicuous for their large, cup-shaped, golden-hued blossoms, and are attractive plants in the garden when in their double-flowered form, requiring only occasional taking up of the roots and transplanting. They are the bulbous crowfoot (*R. bulbosus*, Linn.), with a solid fleshy root, acrimonious and almost caustic; the tall crowfoot (*R. acris*, Linn.), with a fleshy, fibrous root; and the creeping crowfoot (*R. repens*, Linn.), with a prostrate stem and numerous runners. A widely distributed species, ranging from extreme arctic America to the Rocky mountains, and appearing in other parts of the United States, is Pursh's crowfoot (*R. Purshii*, Richardson), and the *R. Sabinii* of R. Brown is one of the few plants that constitute the scanty flora of Melville's island. The early crowfoot (*R. fascicularis*, Muhlenberg) is one of the first harbingers of a New England spring; its flowers are small and yellow. The small-flowered crowfoot (*R. abortivus*, Linn.) blossoms early in shady places, and ventures into the garden as a weed. A curious variety known as the *R. a.* var. *micranthus* is by no means common. The sea crowfoot (*R. cymbalaria*, Pursh) prefers the seaside or the vicinity of salt springs; it has been found from the Arctic sea, in lat. 68°, and met with on saline spots across the continent to the Pacific ocean.—The order *ranunculaceæ* comprises many other beautiful flowering plants, such as the *anemone*, *clematis*, *adonis*, *caltha*, *trollius*, *delphinium*, and *aquilegia;* and many useful in medicine, such as *helleborus*, *coptis*, *aconitum*, and *podophyllum*. In geographical distribution, the largest proportion is found in Europe, which contains more than ⅓ of the whole; very few are found in Africa, and North America possesses about ⅐.

RANZ DES VACHES, the name applied to certain simple melodies played by the mountain shepherds of Switzerland upon the Alpine horn.

nd which are identified with the scenes and ursuits incidental to pastoral life. The term, hich is rendered in German by *Kuhreihen*, means literally cow rows, and is so called from he fact that the cattle, when answering the musical call of the shepherd, move toward him n a row, preceded by those wearing bells. The character of these melodies, which are scarcely such in fact, as they are not governed y the ordinary rules of music, varies in different parts of Switzerland. They are in general without words. A collection of the various *Ranz des Vaches* and other Swiss airs was published in 1818 under the title of *Sammlung von Schweizer Kuhreihen und Volksliedern* (Bern). They are also incorporated in the *Allgemeines Schweizer Liederbuch*, published in 1851.

RANZANI, Camillo, an Italian naturalist, born in Bologna, June 22, 1775, died there, April 23, 1841. At the age of 22 he became professor of philosophy in the university of Fano, where he received holy orders, and taught until 1798. Political disturbances compelling him then to return to Bologna, he was appointed keeper of the botanical garden of that city, and in 1803 professor of natural history in the university, of which he became rector in 1824. In 1836 he introduced a course of lectures on geology, a study which had received little favor in Italian schools. His principal work is his *Elementi di zoologia*, of which 19 volumes were published, and which his death left incomplete.

RAOUL-ROCHETTE, Désiré, a French archæologist, born at St. Amand, department of Cher, March 9, 1790, died July 5, 1854. He was educated at the college of Bourges, repaired to Paris at the age of 21, and in 1813 obtained a prize at the institute for a work upon the "History of the Greek Colonies." In 1815 he succeeded M. Guizot in the professorship of history at the faculty of letters. He became a member of the academy of inscriptions, and one of the contributors to the *Journal des savants* in 1816; succeeded Millin as keeper of the cabinet of medals in the royal library in 1818; held the office of royal censor of newspapers in 1820; and was assistant of Quatremère de Quincy in the chair of archæology in 1824, and succeeded him in 1826. In 1828 he was one of the scientific commission sent by the French government to the Morea. He was admitted in 1838 to the academy of fine arts, of which he became perpetual secretary in the following year. The government of 1848 deprived him of his office as keeper of the cabinet of medals. His works on archæological subjects are extremely numerous.

RAPE (law French, *rapt*; law Latin, *raptus*), the violation or carnal knowledge of a woman, forcibly and against her will. Early English statutes, which have perhaps in the United States the force of common law, extend this to the case of a woman child under the age of 10 years carnally known either with or against her will. Every civilized nation, ancient and modern, has declared by its criminal code its abhorrence of this offence, and affixed to its commission the severest punishments. By the Mosaic law, to ravish a damsel who was betrothed to another was a crime punishable with death; and in case of one not betrothed, the offender was compelled to take the damsel to wife and pay her father a fine of 50 shekels. By the civil law rape was punishable with death and confiscation of goods. Unlike our law, however, the civilians made no distinction between rape as defined by us, of which force is the characteristic element, and seduction without force, of which the criminal law of England and of the United States takes no cognizance; and by the civil law the unlawful carnal knowledge of a woman with her consent was subject to the same severity of punishment as if obtained forcibly and against her will. This, we are told, was because the Roman law entertained so high an opinion of the virtue and chastity of woman, that it would not presume her to be capable of a violation of those qualities, unless induced thereto by the evil arts and solicitations of man; and in order to secure her the more effectually from the danger of these, it made such a violation of chastity, however consummated, equally a crime in him, and visited its penalties upon him alone. By the Saxons, rape was also esteemed a felony and punished with death, though the woman ravished (if single) might redeem the offender from execution if she were willing to accept him as her husband, and he were willing to be so redeemed. But William the Conqueror, probably deeming the punishment of death too severe, altered it to castration and loss of the eyes. In the reign of Edward I. the law was still further modified, and rape was declared to be, and was punished as, a misdemeanor only; but the consequences of this amelioration proving disastrous and inducing a fearful increase of the crime, 10 years afterward, during the same reign, it was restored to the rank of felony and punished as before with death; but by 9 George IV. and 4 and 5 Victoria it was made a non-capital felony, punishable by transportation for life, instead of death, as formerly. In the United States, although by statute the punishment varies somewhat in different states, it is by all treated as felony and punished either with death or imprisonment for life.—It was for a long time an unsettled question what was requisite to constitute this offence, and proof of the full accomplishment of the act was once considered indispensable in order to secure a conviction. As far as the wrong and outrage to the individual is concerned, the crime is perhaps equally entire where the offence is imperfectly committed. But the physical completion of the offence is not now necessary, in law, to complete the guilt of the offender; for it is not the degree of gratification to the lust of the ravisher which gauges the degree of criminality, but the injury done to the person and feelings of the victim, and the dastardly violation of that mod-

This, the first work executed by Raphael in Rome, is also the last of his large compositions which contains traces of his early religious, Peruginesque manner. The influence of the antique, which he here first felt in its fulness, the proximity of Michel Angelo, who was then painting his sublime frescoes in the Sistine chapel, and the importance and grandeur of the subjects upon which he was engaged, gave a new impulse to his genius, and he reached almost at a single step the limit of his style. His next work in point of date, "Poetry" or "Parnassus," representing an assembly of Greek, Roman, and Italian poets on Mount Parnassus, with Apollo and the Muses in the centre, marks perhaps the transition period; but in "Philosophy" or the "School of Athens," which followed, the Roman style is matured. The composition represents a grand hall or portico, in which are characteristically grouped the great philosophers and sages of antiquity. The remaining fresco in this *stanza*, "Jurisprudence," owing to the peculiar construction of the wall, is divided into 3 compositions, Gregory delivering the ecclesiastical law and Justinian promulgating his code of civil law, above which are female personifications of prudence, fortitude, and temperance. These frescoes were finished in 1511, and appear to have been immediately succeeded by those in the *stanza* of Heliodorus, so called from the story of the expulsion of Heliodorus from the temple, as related in the 2d book of Maccabees, which is painted on one of its walls. In this composition the group of Heliodorus and the pursuing angels is especially noticeable for its supernatural power. The "Mass at Bolsena," "Attila terrified by a Celestial Vision," and "St. Peter delivered from Prison" occupy the remaining walls of this *stanza;* and on the ceiling are representations of the promises of God to the four patriarchs, Abraham, Isaac, Jacob, and Moses. Julius died during the progress of the work, but his successor, Leo X., directed its completion, as also that of the other works in the Vatican on which Raphael was engaged, beside intrusting him with new ones. Before this time, however, commissions multiplied so greatly upon the painter's hands, that he was obliged to commit to the best of the numerous scholars who now resorted to him from all parts of Italy the execution of portions of the frescoes in the remaining *stanze* from his cartoons and designs. In this manner was painted the *stanza dell' incendio*, which takes its name from the principal subject illustrated, the "Fire in the Borgo," and in which are represented the prominent events in the lives of Popes Leo III. and IV. The frescoes in the *sala di Costantino*, the last of the series, were executed after his death under the direction of Giulio Romano, his most eminent pupil. They all suffered from neglect after the removal of the popes to the Quirinal palace, and were cleaned and in some instances restored by Carlo Maratti in the 18th century. While engaged on these works Raphael executed in fresco for Agostino Chigi, a banker of Rome, the 4 grand figures of the Sibyls in the Chigi chapel of Sta. Maria della Pace, and the well known "Triumph of Galatea," beside many Madonnas and other easel pictures. His fortune kept pace with his celebrity, and he lived in princely magnificence, honored by the chief statesmen and authors of the day, and admired and beloved by all contemporary artists, excepting Michel Angelo, whose haughty spirit ill endured the fame of his young rival. During the progress of the later works in the *stanze* Leo X. employed Raphael on two other important undertakings, the decoration of the *loggie*, or open galleries running round 3 sides of the court of St. Damasus (the older portion of the Vatican), and the designs for the tapestries of the Sistine chapel. For the *loggie* he furnished a celebrated series of designs from the Old Testament, known as "Raphael's Bible," and which were executed in 13 small cupolas on the gallery on the 2d story by Giulio Romano, Francesco Penni, Pellegrino da Modena, Perino del Vaga, and others of his pupils. A variety of beautiful arabesque ornaments and stuccoes in the same gallery were executed from his designs by Giovanni da Udine. The cartoons for tapestries, prepared probably between 1513 and 1516, represent the highest efforts of Raphael's genius in historical composition. They are from 14 to 18 feet in length by 12 in height, and are colored in distemper. The subjects illustrated are the "Death of Ananias," "Elymas the Sorcerer struck with Blindness," "The Healing of the Lame Man at the Beautiful Gate of the Temple," "The Miraculous Draught of Fishes," "Paul and Barnabas at Lystra," "Paul preaching at Athens," and "The Charge to Peter;" these cartoons, at the suggestion of Rubens, were purchased by Charles I. of England, and are now deposited in Hampton Court palace. The remaining cartoons of the series, representing the "Stoning of Stephen," the "Conversion of St. Paul," and "Paul in the Prison of Philippi," are lost. The original tapestries, for which the pope paid the manufacturers in Arras 50,000 gold ducats, after various mutations of fortune, are now in the Vatican, but are so injured and faded that the general effect of the coloring is destroyed. Raphael also furnished the designs, but not the cartoons, for a second series of 10 tapestries, which are also in the Vatican. Amid these great undertakings he did not neglect the subjects which had first inspired his pencil, and the numerous Madonnas and holy families produced during his residence in Rome include some of the most characteristic and admirable of his works. Distinguished among them is the wonderful *Madonna di San Sisto* (painted between 1517 and 1520) in the Dresden gallery, representing the Virgin standing in a majestic attitude with the child in her arms. It is said to have been painted at once on the canvas, without any preliminary study, and has been engraved in a style not unworthy of the original by Friedrich Müller. Other celebrated Madonnas of this period are the Aldobrandini Madonna, in the possession of Lord Garvagh, that known as the Bridgewater, the *Vierge au diadème* in the Louvre, the lovely *Madonna della sedia* or *seggiola* in the Pitti palace, the *Madonna di Foligno* in the Vatican, that called the "Pearl" at Madrid, and the *Madonna del pesce* in the Escurial, the two last mentioned being altar-pieces with saints assembled around the Virgin. Of several of these duplicates exist, and all of them have been repeatedly engraved. Among his remaining easel pictures are the St. Cecilia, now in Bologna; the "Archangel Michael overcoming the Devil," in the Louvre; "Christ bearing the Cross," known as *Lo spasimo di Sicilia*, in Madrid; and his last, and by many considered his grandest work, the "Transfiguration," in the Vatican, painted in competition with Sebastian del Piombo's "Raising of Lazarus," of which Michel Angelo is said to have furnished the design. Of his portraits, of which he executed upward of 50, the most famous are those of Julius II. and Leo X., the originals of both of which are in Florence, Cardinals Bibbiena, Bembo, de' Medici, and de' Rossi, Joanna of Aragon, and the "Fornarina," which was long supposed to represent one of his mistresses, but which Passavant considers to be the portrait of a celebrated improvisatrice named Beatrice Pio. The last named picture is in the Barberini palace in Rome. To this list of works must be added the fresco of "Cupid and Psyche" in the villa Farnesina, and numerous drawings in chalk, from which Marc' Antonio Raimondi, who engraved many of Raphael's best works, executed several of his finest plates. If in addition we mention that he directed the construction of St. Peter's from his own plans subsequent to the death of Bramante in 1514, beside executing several other architectural works; that in the latter part of his life he had commenced important researches into the architectural remains of Roman antiquity; and that he executed at least one statue in marble, beside designing others, we have the record of a life which, considering its brevity, is without a parallel in the history of art. He died of a fever caught in superintending some subterranean excavations, and was buried in the Pantheon, near the remains of Maria di Bibbiena, niece of the cardinal of that name, to whom he had been betrothed. Through some doubt as to the place of his sepulchre, his remains were exhumed in Sept. 1833, and on Oct. 18 reinterred with great ceremony. Of his private character Mrs. Jameson says: "There was a vulgar idea at one time prevalent that Raphael was a man of vicious and depraved habits, and even died a victim to his excesses; this slander has been silenced for ever by indisputable evidence to the contrary, and we may now reflect with pleasure that nothing rests on surer evidence than the admirable qualities of Raphael; that no earthly renown was ever so unsullied by reproach, so justified by merit, so confirmed by concurrent opinion, so established by time." His life has been written by Quatremère de Quincy and Passavant, the work of the latter being the latest and fullest; and more briefly by Mrs. Jameson in her "Memoirs of the early Italian Painters." See also Kugler's "Handbook of Italian Schools."

RAPHALL, Morris Jacob, Ph.D., a Jewish rabbi and author, born in Stockholm, Sweden, in Sept. 1798. Being designed by his parents for the ministry, he was sent at an early age to the Jewish college at Copenhagen, where, when but 12 years old, he received the degree of *chabir* or *socius*, which entitled him to the designation of rabbi. In 1812 he went to England, and there acquired so complete a mastery of English as to speak it with the fluency of a native. In 1818-'20 he made a tour of the continent, and in 1821 entered the university of Giessen, where he remained nearly 4 years. In 1825 he returned to England, where he married and took up his residence, distinguishing himself as a lecturer on Hebrew biblical poetry. In 1834 he commenced a weekly periodical, "The Hebrew Review, or Magazine of Rabbinical Literature," the first Jewish periodical ever published in Great Britain; but in 1836 impaired health compelled him to relinquish it. Between 1834 and 1837 he translated into English some writings of Maimonides, the *Sepher Ikkarim* or "Book of Principles" of the rabbi Joseph Albo, and the *Yain Lebanon*, a work on ethics, of Rabbi Naphtali Hirtz Wessely. In 1839 he published "Festivals of the Lord," a series of essays on Jewish festivals. The persecution of the Jews at Damascus in 1840 brought him into intimate relations with the chief rabbi of England, Dr. S. Hirschel, for whom he acted as secretary, and at whose instance he drew up an expurgatory declaration, in Hebrew, English, French, and German. During that year he again visited Germany, and soon after his return published, jointly with the Rev. D. A. De Sola of London, a translation of 18 treatises of the *Mishna*. Soon afterward he commenced, in connection with Messrs. De Sola and Lindenthal, a translation of the Hebrew Scriptures, with copious notes, of which only Genesis has yet been published. In 1841 he was appointed rabbi preacher to the synagogue at Birmingham, where he devoted his energies to the founding of a Hebrew national school, the first created by the provincial Jews of England. He was also engaged in several controversies in regard to Judaism, and published 3 or 4 polemical works on the subject. He was a frequent contributor to periodicals, and lectured with success on biblical poetry, the post-biblical history of the Jews, and on geography and statistics. He also advocated publicly the removal of the civil disabilities of the Jews. In 1849 he determined to remove to the United States, and on his departure the mayor and principal inhabitants of the city of Birmingham, of all denominations, united in an address thanking him for his efforts in the cause of public education, and in behalf of the public institutions of the city. The address was accompanied by a purse of 100 sovereigns. On his arrival in New York, he accepted a call from the first Anglo-German Hebrew congregation of the city, known as the "Great Synagogue," to serve them as rabbi preacher. In 1852 he published "Devotional Exercises for the Daughters of Israel;" in 1856 his lectures on the "Post-Biblical History of the Jews," carefully revised, in 2 vols.; in 1859 a small pamphlet entitled "The Path to Immortality;" and in 1861 a discourse under the title, "The Bible View of Slavery."

RAPIDES, a W. parish of La., separated from Texas on the W. by the Sabine river, bounded N. E. by Little river, and intersected by the Red and Calcasieu rivers; area, about 2,000 sq. m.; pop. in 1860, 25,360, of whom 15,358 were slaves. The surface is nearly level and the soil generally fertile. The productions in 1855 were 610,645 bushels of Indian corn, 15,084 hhds. of sugar, 49,546 bbls. of molasses, and 22,285 bales of cotton. Capital, Alexandria.

RAPIN-THOYRAS, Paul de, a French historian, born in Castres in 1661, died in Wesel, May 16, 1725. He was of a Protestant family which came originally from Savoy, and became an advocate, but subsequently turned his attention to the profession of arms and to literary studies. Obliged to leave France by the revocation of the edict of Nantes, he first went to England, where he arrived in 1686, and from that country passed over to Holland, and there joined a company of French cadets, and followed the prince of Orange (William III.) to England. He was present at the battle of the Boyne, and was severely wounded in the siege of Limerick, and in consequence forced to quit the army. He afterward became tutor of the young earl of Portland, and in 1707 settled in Wesel, on the Rhine, where he composed his works. Of these the most important is his *Histoire d'Angleterre* (9 vols. 4to., the Hague, 1724), in which the narration of events is carried down to the death of Charles I. It was translated by N. Tindal, with a continuation to the death of George I., and often printed (2 vols. fol., 1722; 5 vols. fol., 1743; 21 vols. 8vo., 1757). The work is generally marked by accuracy of statement and clearness of expression, and forms a complete body of English history which had no competitor till the work of Hume; as a careful and trustworthy compilation it is scarcely yet superseded.

RAPOPORT, Solomon Jehudah, a Jewish antiquary and rabbi, born in Lemberg, Austrian Galicia, in June, 1790. He first attracted attention among his coreligionists by notes to a Talmudical work of his father-in-law, Rabbi Löw Neller, and subsequently rose to the highest rank among the Hebrew writers of the age by critico-biographical and other contributions to the periodicals *Bikkure haittim* (Vienna, 1820–'31) and *Kerem hemed* (Vienna and Prague, 1833–'45), and numerous minor dissertations in Hebrew and German inserted in various other publications. He translated into Hebrew verse Racine's "Esther," entitled *Sheerith Jehudah* (Vienna, 1827). His principal work is *Erech millin* (1st vol., Prague, 1852), which is to form part of a comprehensive historico-critical dictionary of rabbinical knowledge in two divisions. Having officiated for some time as rabbi at Tarnopol, he was elected in 1840 to fill a similar office at Prague, a position which he still holds. His 70th birthday, in 1860, was the occasion of salutatory addresses from numerous Jewish congregations of the European continent, England, and America.

RAPP, Georg, founder of the sect of the Harmonists, born in Würtemberg in 1770, died at Economy, Penn., Aug. 7, 1847. In his younger days he believed that he had experienced a divine call, and that he was charged with the restoration of the Christian religion to its original purity. He did not long confine himself to spiritual matters, but formed the plan of a community organized on the model of the primitive church with goods in common. As in the promotion of this object he was hindered by the state, he removed in 1803 with his followers to America. (See Harmonists.)

RAPP, Jean, a French general, born in Colmar, April 29, 1772, died in the grand duchy of Baden, Nov. 18, 1821. He entered a cavalry regiment in the French army as a private in 1788, distinguished himself during the wars of the revolution, became an aide-de-camp of Desaix during the campaigns in Italy, and went with that general to Egypt. After the battle of Marengo he was promoted by Napoleon, and attached to his staff. When Napoleon became emperor Rapp was raised to the rank of brigadier-general. At the battle of Austerlitz he decided the victory by precipitating his force upon the Russian imperial guard, driving all before him, and taking Prince Repnin prisoner; for this he was made general of division. He distinguished himself highly in the succeeding campaigns, especially at the battle of Golymin, where he was wounded for the 9th time. To enable him to recruit his health he was intrusted with the government of Thorn, and subsequently with that of Dantzic. He was in the campaign against Russia, receiving at the Moskva his 22d wound; and after the disastrous result of that invasion he threw himself into Dantzic, where he was blockaded by the Prussians and Russians. He held out 12 months, but was finally compelled to surrender, and was carried to Russia as prisoner of war. Returning to France upon the first restoration, he was intrusted by Louis XVIII. with the command of the first army corps, charged with the duty of resisting the march of Napoleon. But, following the example of others, he soon went over to his old leader, and was appointed by being commander of the 5th division, member of the chamber of peers, and commander-in-chief of the army of the Rhine. There, pressed by an Austrian army far superior to his in numbers, he retired to Strasbourg, and after the second restoration betook himself to Switzerland. In 1818 he returned to France, and was received with favor and reinstated in the army. When the news of Napoleon's death reached France, Rapp burst into tears in the presence of the whole court. He wrote a description of the siege of Dantzic, and also left a volume of "Memoirs," published in 1823.

RAPPAHANNOCK, a river in the E. part of Virginia, formed by the confluence of the North fork and other small streams, which rise in the Blue ridge and unite on the N. E. border of Culpepper co. At the S. E. extremity of that county it receives the waters of the Rapidan, its largest tributary; thence flowing about 40 m. in a devious course, it reaches tide water at Fredericksburg, where by a fall it supplies valuable power; thence it becomes navigable, and enters Chesapeake bay by an estuary about 70 m. long. The whole length in a straight line from its sources to Chesapeake bay is about 140 m., but with its numerous and intricate windings its real length must be nearly twice as much. Its general course is S. E.

RAPPAHANNOCK, a N. E. co. of Va., bordered N. E. by the North fork of the Rappahannock, and drained by others of its head waters; area, about 250 sq. m.; pop. in 1860, 8,850, of whom 3,520 were slaves. It is bordered on the N. W. by the Blue ridge, and has a generally fertile soil. The productions in 1850 were 157,699 bushels of wheat, 218,216 of Indian corn, 3,273 tons of hay, 2,785 lbs. of tobacco, and 24,946 of wool. There were 15 grist mills, 11 churches, and 137 pupils attending public schools. Value of real estate in 1856, $2,029,432, showing an increase of 36 per cent. since 1850. Capital, Washington.

RARATONGA, or RAROTONGA, an island of the S. Pacific ocean, Cook's group; lat. (of centre) 21° 15' S., long. 160° 7' W.; pop. estimated at 4,000. It is about 30 m. in circumference, is surrounded by a reef, and has no anchorage for ships. It was first seen from the ship Seringapatam in 1814; but Mr. Williams, the missionary, also claims the discovery of it in 1823. The inhabitants have been converted to Christianity, and have made considerable progress in civilization.

RAREY, JOHN S. See HORSE, vol. ix. p. 266.

RARITAN, a river of New Jersey, formed by the confluence in Somerset co. of two branches, both having their sources in the mountains of Morris co.; the North branch flows nearly due S., and the South branch makes a curve S. W. through Hunterdon co., and then forms a circuit to the N. From the junction the course of the Raritan is nearly E. It passes by New Brunswick, whence it is navigable to Raritan bay, which it enters at Perth Amboy. The main stream is about 30 m. long.

RASK, RASMUS CHRISTIAN, a Danish philologist, born in Brendekilde, near Odense, on the island of Fünen, Nov. 22, 1787, died in Copenhagen, Nov. 14, 1832. He was graduated at the university of Copenhagen, was appointed an assistant in the university library in 1808, devoted himself to the study of northern history and literature, and in 1811 published in Danish his first work, an "Introduction to the Study of the Icelandic or Old Norse Language." With Nyerup in 1812 he made a journey to Sweden, and in 1813 went to Iceland, where he remained 2 years studying its history and literature. In 1816 he determined to undertake a journey to the East, and after remaining some time in Stockholm, and during the years 1818 and 1819 in Finland and St. Petersburg, occupied with the study of Finnish, Russian, Armenian, Persian, and Arabic, went to Persia and passed some time in Erivan, Teheran, Ispahan, Shiraz, and among the ruins of Persepolis. Thence he went to India and Ceylon, returned to Copenhagen in 1823, was soon after appointed professor of literary history in the university, and in 1829 was made professor of oriental languages and first librarian. According to Bunsen, Rask anticipated to a certain degree some of the greatest discoveries of Grimm, Bopp, and Burnouf. In his Icelandic, Anglo-Saxon, and Frisian grammars, he expounded the laws of those languages with the greatest possible completeness, first promulgated the law of the transposition of sounds, made the first comparative exhibition of German, Greek, Latin, and Lithuanian grammars, and originated the real knowledge of the Zend language.

RASKOLNIKS (Russ., schismatics, heretics), the collective name given to the religious sects of Russia which have originated by secession from the state church. They call themselves *starovertsi*, that is, adherents of the ancient faith. The origin of the various branches of Raskolniks is assigned to the middle of the 17th century, though some of them were strengthened by the scattered remains of former sects. The occasion for the formation of the Raskolniks was the corrected and altered edition of the Slavic translation of the Bible and the Slavic liturgical books, commenced in 1653 by order of the patriarch Nicon of Moscow, and ratified in 1654 by a synod at Moscow. Against this change of the official church rituals there arose a violent opposition, the leaders of which charged the state church with apostasy from the true faith, and proclaimed the necessity of leaving its communion. As they did not agree among themselves, a number of sects were founded at the same time. The Russian government has generally persecuted them all with the utmost rigor and cruelty, and their history therefore is involved in great obscurity. As they have had to keep themselves concealed, even their principles are very imperfectly known. In general they may be divided into two large classes, the "popish" sects, which have retained the office of priests (Russ. *pop*, priest), and, in general, the ecclesiastical organization of the state church; and the "anti-popish," which have no priests at all, but understand the general priesthood of the faithful in the widest and most literal sense of the word. The most important and best known among the numerous sects are the following: 1. The Duhobortzi, who first made their appearance under the reign of the empress Anna (1730-'40). They have neither churches nor ordained priests, reject oaths, condemn war, and resemble in many other points the society of Friends and the Mennonites. They were cruelly persecuted under Catharine II. and Paul, but obtained toleration under Alexander I. The Cossacks on the Don belong mostly to this sect, and a confession of faith, presented by them to the Russian government, has appeared in print. 2. The Pomorans have become especially celebrated for permitting suicide, for which they cite Mark viii. 35 *et seq.*, and which they generally accomplish by self-burning. The custom seems to have abated somewhat in modern times, but in 1860 an uncommonly large number of cases attracted the attention of the civilized world. They possess a confession of faith in 46 articles, drawn up at a synod in Poland in 1751. 3. The Philippons, called after their founder, a plain countryman named Philippos Pustosviet. A part of this sect, owing to the incessant persecution to which they were exposed, have emigrated from Russia. According to the census of 1858, about 1,200 of them were living in East Prussia, where the free exercise of their religion, ecclesiastical self-government, and exemption of the present generation from military service have been granted to them. 4. A special interest has been of late awakened in the Molokans, part of whom emigrated to Turkey, and there became acquainted with the Protestant missionaries from America, who represent them as agreeing in all essential points with the principles of Protestant Christianity. Their number is estimated at several millions.—About 10 years ago the chief sect of the "popish" Raskolniks prevailed on a Greek bishop of Austria to ordain one of their priests as a bishop, and thus obviated the main objection of the writers of the Russian church to their separate organization, that their connection with the apostolical church was interrupted. In order to relieve them from the necessity of living under the jurisdiction of bishops who, to avoid imprisonment, had to live in foreign countries on the Russian frontier, Alexander II. in 1859 issued an edict which makes it the duty of the bishops of the state church to consecrate the bishops and priests of the Raskolniks. As to the aggregate number of the Raskolniks, it is utterly impossible to obtain any trustworthy information, as every Russian census includes them in the membership of the state church. The statements of the Russian writers vary from 5,000,000 to 15,000,000, but the latter estimate is now generally believed to be nearer the truth, and the best accounts represent them as rapidly increasing. A comprehensive work on their history, with particular reference to the internal condition of the Russian church and civilization during the 17th and the first half of the 18th century, was published at St. Petersburg in 1859 by Shtchapoff.

RASPAIL, François Vincent, a French chemist and politician, born at Carpentras, department of Vaucluse, Jan. 29, 1794. He was educated at the seminary of Avignon with the design of entering the church, and in 1811, though but 17 years old, delivered there a course of lectures on philosophy, and in 1812 one on theology. Refusing to take orders, he went to Paris after the second restoration, and supported himself by private teaching. In 1824 he presented to the institute his first memoir, a treatise upon the classification of grasses, and in 1825 became attached to the *Bulletin des sciences* of Férussac. In 1729 he founded with M. Saigey the *Annales des sciences d'observation*. Becoming involved in a controversy with Cuvier and Geoffroy St. Hilaire, he issued against them in 1830 a work entitled *Coups de fouet scientifiques* ("A Scientific Horsewhipping"). Having from the first participated in the secret political movements of Paris, he took an active share in the revolution of July, 1830, when he was wounded; but he was opposed to the elevation of Louis Philippe, and refused to accept from him the cross of the legion of honor. He aided in the organization of the *amis du peuple* and other secret societies aiming at his overthrow, was the chief editor of the *Réformateur*, was many times prosecuted, and spent altogether 6 or 7 years in prison, where he wrote several of his scientific works, and his experience in which furnished the materials for the *Réforme pénitentiaire* (2 vols. 8vo., 1839). In 1840, on the celebrated trial of Mme. Lafarge for poisoning her husband, he offset the testimony of Orfila to the detection of arsenic in the intestines of the victim, by asserting that that proved nothing, since arsenic was diffused through all bodies, and could be found even in the wood of the judge's chair. This statement he developed at length in the *Mémoire à consulter* published by the defence, which gave rise to considerable controversy. Having adopted the theory that disease is most frequently occasioned by internal or external parasites, he fixed upon camphor as the best general agent for destroying them, which he prepared and sold at first in the form of cigarettes, afterward using it also in other modes and combining with it other remedies, according to circumstances. He published several works in exposition of his system, opened an office for gratuitous consultation, and met with great pecuniary success, though he was several times prosecuted and even imprisoned for illegal practice of medicine. In 1848 he headed the crowd which gathered at the Hôtel de Ville on the evening of Feb. 24, and proclaimed the reublic before the arrival of the provisional gov- rnment. Refusing any public office, he estab- ished the *Ami du peuple* daily newspaper. e was one of the leaders of the insurrection f May 15, and was arrested and confined at incennes till April, 1849, when he was tried nd condemned to 5 years' imprisonment at oullens. Notwithstanding his incarceration, e was, in Sept. 1849, elected by the depart- ent of the Seine a member of the national as- embly, and in December received 36,000 votes r the presidency. On his release in April, 854, he retired to Belgium, and has since pub- ished a periodical entitled *Revue complémen- aire des sciences appliquées.* He has written any valuable works on chemistry and kindred ientific subjects.

RASPBERRY (*rubus*, Linn.), a small edible uit of the natural order of *rosaceæ*. The owers consist of a 5-parted calyx without racteoles, 5 deciduous petals, and numerous tamens and styles. The fruit is a collection f carpels forming a hemispherical berry, hol- w beneath and falling off whole from the ry receptacle when ripe; the styles remain- g in a withered state give it a bristly appear- nce, from which the term rasp is applied to . The raspberry grows readily from seeds, d is widely distributed by the birds which ed upon it. It is liable to variation, especially nder cultivation. The species most generally ltivated is the *R. Idæus*, a native of Europe and f Mt. Ida in Crete, whence its specific name. rom this have originated a great many dis- inct and permanent varieties of much value, uch as the red and white Antwerp, the twice- earing, Barnet superb, red globe, Franconia, astolf, hornet, white transparent, prince of ales, Knevett's giant, Souchetti, imperial, c. Of the American seedling varieties may e mentioned the Allen, Catawissa, Cushing, rench, and Brinkle's orange. All the sorts row freely in any good garden soil, especially f it be moist; if dry, the berries are small and alf-grown. The ground should be kept light nd rich to promote the sending out of the urface roots, and supernumerary suckers hould be removed. Pruning is performed in utumn or early spring, cutting out all the ead stems. The plants do best when secured o firm stakes; they may be trained advan- ageously to fences or walls, a sunny or shaded xposure affecting the time of ripening the uit. The raspberry is well adapted to small ardens, as it will grow readily under the shade f trees; and when raised for the market in pen spaces the yield is abundant and profit- ble.—The wild red raspberry (*R. strigosus*, x.) closely resembles the European species, produces a fine-flavored but tender watery uit, and grows in the greatest profusion upon e hillsides of New England, ripening in ly and August. It even grows well in the ities, and some varieties of much repute ave been observed. The black raspberry or imbleberry (*R. occidentalis*, Linn.) is remarkable for its blue or glaucous stem and foliage, and its purplish black and firm, pleasant-tasted berries, bearing abundantly, and repaying any care bestowed upon it. The cloudberry (*R. chamæmorus*, Linn.) is found in northern New England, on the White mountains and similar elevations, and is the same species which in Lapland is esteemed as a valuable food. The purple-flowering raspberry (*R. odoratus*, Linn.) is a common plant in the northern states, and is conspicuous for its large showy blossoms, which make it a fine ornamental shrub for the garden. It has large, simple, lobed leaves; its fruit is large, flat, dry, and agreeably acid, but rare.

RASSE. See CIVET.

RASTADT, a fortified town of Baden, on the river Murg, about 9 m. S. S. W. from Carlsruhe; pop. 6,500. In 1714 a treaty of peace was signed here by Prince Eugene and Marshal Villars, which put an end to the war of the Spanish succession. The second congress of Rastadt met Dec. 9, 1797, to negotiate a treaty of peace between France and the German empire. It was not dissolved until April, 1799; and when the two French ambassadors, Roberjeot and Bonnier, set out on their return, they were assassinated by Austrian horsemen a short distance from the city. Rastadt is one of the strong places of the German confederation; its defensive works are of great strength and extent. In May, 1849, the garrison having mutinied, the place became the principal and last stronghold of the German republicans; but after a short resistance under Mieroslawski it surrendered to the troops of the prince of Prussia in July.

RAT, a well known rodent, the type of the sub-family *murinæ*. In the murine tribe of this sub-family, confined originally to the old world, belong the common house rats. The brown or Norway rat (*mus decumanus*, Pall.) has a body 8 to 10 inches long, and the tail 6 to 8 inches, scantily covered with hair and with about 200 rings; the color above is grayish brown mixed with rusty, grayer on the sides, and ashy white below; the upper surface of the feet dirty white. This species, originally from India and Persia, entered Europe through Russia, appearing in the central countries about the middle of the 18th century; it was brought to America about 1775, and has since greatly increased in numbers, driving out here as in Europe the black rat which had been previously introduced; it is now generally distributed over the world, having been transported in ships, and most abundantly near the sea coasts. Its haunts are well known to be cellars, sewers, canals, docks, and similar dirty places, wherever it can make a burrow or find abundant food; it is a great household pest, and so prolific that its devastations are sometimes very great; it breeds from 3 to 5 times a year, having 12 to 15 at a birth, the males always being the most numerous. Not only the black rat, but other species indigenous to the old world, are driven off or destroyed by it; the dead and even living persons are attacked by it when hard pressed; it is not only pursued by man, dogs, and cats, but the stronger will kill and devour the weaker of its own species. The black rat (*M. rattus*, Linn.) is 7 or 8 inches long, with a tail of 8½; the color is very dark, often nearly black, with numerous long hairs projecting from the short and soft fur, plumbeous beneath, and the feet brown; it has a slighter form than the brown rat, with the upper jaw more projecting, the ears larger, and the tail much longer in proportion. It is not very strong, but exceedingly active; being rather timid, it is exterminated by the larger and fiercer brown rat; the habits of the two species are much the same, but the black rat is less a burrowing animal, and prefers the upper parts of houses to cellars and low dirty places. It used to be the common house rat in Europe and warm countries, until driven off by its congener; it appears to have been brought to the new world about the middle of the 16th century; it came originally from central Asia; like the preceding species it is omnivorous. The roof or white-bellied rat (*M. tectorum*, Savi) is about 6½ inches long, and the tail about 8, with 240 rings; it is colored above like the brown rat, the lower parts and upper surface of feet yellowish white; the head is rather blunt, the eyes large, whiskers long and black, ears very large, and the thumb rudimentary. It came originally from Egypt and Nubia, thence passed to Italy and Spain, and from the last to America in the 15th century; it is common in Mexico and Brazil, and in the southern states, but is rarely found above North Carolina; it is fond of inhabiting the thatched roofs of houses, whence its name; it is the same as the *M. Alexandrinus* (Geoffr.) and *M. Americanus* (Seba). Some of the East Indian rats are far larger than any of these; the giant rat of Bengal and the Coromandel coast (*M. giganteus*, Raffles) has a body 13 inches long and a tail as much more; this is very destructive in gardens and granaries, devouring chickens and ducks, undermining houses, and piercing the mud walls; this is the largest of the sub-family, a male weighing as much as 8 lbs.; it is often eaten by the lower caste Hindoos.—All these rats are very fond of fighting, and with their omnivorous habits are decidedly murine cannibals, eating not only their conquered brethren but their young. Though living in the filthiest places and in the foulest air, they always have a sleek coat, and take the greatest pains to clean themselves, licking the paws in the manner of a cat; during mastication the jaws move very rapidly; they drink by lapping; when asleep the body is coiled in a ball, with the nose between the hind legs, and the tail curled around the outside, leaving only the ears out ready to catch the least sound of danger; as food fails they migrate in companies from one place to another. There are more muscles in a rat's tail than in the human hand; this most useful appendage, with its chain of movable bones and numerous muscles, is covered with minute scales and short stiff hairs, rendering it prehensile, and capable of being employed as a hand, balancer, or projecting spring. The teeth are long and sharp, but there is nothing specially dangerous in wounds made by them; their strength enables them to gnaw ivory, as dealers in this article well know; in fact, even in Africa, elephants' tusks are found gnawed by rats, squirrels, porcupines, and perhaps other rodents, as long as any gelatine is contained in them. They are very subject to tumors of the skin, which often end fatally; they also perish soon without water. Persecuted as these animals are, they have their uses, especially as scavengers for devouring refuse matters which would otherwise engender disease, as in tropical climates or in large cities, in the sewers of which they live in legions; their skins are employed for various purposes, as in the manufacture of the thumbs of gloves, but are too delicate for any article requiring much strength. The Chinese and other Asiatic nations, and many African tribes, consider the flesh of rats a great delicacy; and arctic travellers have often found them a welcome addition to their bill of fare.—In the sigmodont tribe of the *murinæ*, belonging entirely to the new world, beside the genera noticed under MOUSE, may be mentioned *neotoma* (Say and Ord); in this the fur is soft and full, the form rat-like, the tail long and more or less hairy; ears very large and nearly naked; molars rooted; heels hairy. It is peculiar to North America, and found in the United States except New England; some of the species are much larger than house rats, and are rather handsome animals. The Florida or wood rat (*N. Floridana*, Say and Ord) is about 8 inches and the tail 6, the short stiff hairs of the latter not concealing the scaly rings; the color above is plumbeous mixed with dark and yellowish brown, lighter on the sides, beneath and the feet white; tail dusky above, below white; the head is sharp. It is abundant in the southern Atlantic and gulf states, and is found occasionally in the west; the habits vary much in different localities, living in some places in the woods, in others under stones or in the ruins of buildings; in swampy districts it heaps up mounds 2 or 8 feet high, of grasses, leaves, and sticks cemented by mud; sometimes the nest is made in the fork or the hollow of a tree. It is crepuscular, very active and an excellent climber; the food consists of corn, nuts, cacti, crustaceans, mollusks, and various roots and fruits; the disposition is mild and docile; from 3 to 6 young are produced twice a year. The bush rat (*N. Mexicana*, Baird) is rather smaller, light brown above, fulvous on the sides, under parts and feet white; tail hairy. Larger species are found west of the Rocky mountains, very destructive to the furs, blankets, and stores of the trappers; for an account of these see vol. viii of the "Reports of the Pacific Railroad Expedition." In the bone caves of Pennsylvania have been found the remains of a species whose body must have been at least 15 inches long.—In the genus *sigmodon* (Say and Ord) the general appearance is that of a large field mouse; the body is stout, the hair long, the muzzle blunt and hairy except on the septum; the upper lip slightly notched; thumb rudimentary; soles naked, with 6 granular tubercles; incisors stout, the upper much rounded; ears and tail moderate; molars rooted, with a plane surface, the last 2 lower with the enamel in the form of an S, whence the name. The genus is confined to the southern parts of the United States. The best known species is the cotton rat (*S. hispidus*, Say and Ord), about 5 inches long with a tail of 4; the color above is reddish brown, brightest on the sides, lined with dark brown, and under parts grayish white; the hair is long and coarse, and the claws very strong. It is more abundant in the southern states than the meadow mice in the north, living in hedges, ditches, and deserted fields, and consequently doing but little damage to the planter. It is gregarious, feeding on seeds of grasses and leguminous plants, and also on flesh; it picks up wounded birds and small mammals, crawfish, and crabs; it is very fierce and pugnacious, the stronger killing and devouring the weaker, and the males often eating the young; it is also very fond of sucking eggs. Nocturnal in habit, it is seen by day in retired places; it digs very extensive galleries, not far from the surface, a family in each hole; very prolific, it breeds several times a year, having 4 to 8 in a litter; it swims and dives well. It received its name not from any injury it does to the cotton plant, but from its lining the nest with this substance, which it is said to collect in large quantities. It is preyed upon by foxes, wild cats, hawks, and owls; it is not found north of Virginia.

RATAN. See Rattan.

RATAZZI, Urbano, an Italian statesman, born in Alessandria, Piedmont, June 29, 1808. He settled as an advocate in Turin, and afterward distinguished himself by his learning and his eloquence at the court of appeal in Casale. After the revolution of 1848 he was elected from the college of Alessandria to the chamber of deputies at Turin, in which body he took his place among the liberals. After the defeat of Custozza (July 25) Charles Albert called him into the ministry, which was obliged to resign 8 days afterward. Ratazzi then joined the opposition under Gioberti, on whose triumph, Dec. 16, he received the post of minister of the interior and subsequently of justice. He however separated from Gioberti on the proposition to send a Piedmontese army to Rome for the purpose of restoring the pope; and this project, sharply rejected by the parliament, hastened the fall of Gioberti. Ratazzi however retained his position in the ministry until the abdication of Charles Albert, when he found himself again in the ranks of the opposition. He afterward joined the party of moderate reformers, and became vice-president and in 1852 president of the chamber; and in 1854 he reentered the ministry with the portfolio of justice, under the presidency of his former opponent, Count Cavour. On Cavour's retirement after the peace of Villafranca Ratazzi became minister of the interior, but resigned in July 1860 when Cavour returned to office.

RATEL, a plantigrade mammal of the badger family, and genus *mellivora* (Storr), named honey badger from its fondness for honey. The size is about that of the badger, but rather heavier, and with less projecting nose; the cheek teeth, according to Owen, are premolars $\frac{3-3}{3-3}$ and molars $\frac{1-1}{1-1}$, with no tuberculate tooth in the lower jaw; the feet are short and plantigrade, the anterior with large claws; the hair is long and rigid, and the skin tough. The African ratel (*M. Capensis*, Storr) is gray above and black below, the two colors separated by a white line. It inhabits the Cape of Good Hope, the Mozambique coast, and other parts of southern Africa, burrowing in the ground for its dwelling and also in search of the nests of wild bees, against whose stings its loose and leathery hide is ample protection; according to the Hottentots it is guided to these nests by the honey guide, a bird of the cuckoo family and genus *indicator* (Vieill.). It also eats birds, rats, snakes, and flesh of almost any animal, living or dead. The Asiatic ratel (*M. Indica*, Storr) much resembles the African, but has a shorter tail and no white lateral stripe; it is found in India, in the high banks of the Ganges and Jumna; it is nocturnal in habit, prowling around in search of food, and often preying upon imperfectly buried human bodies. It is a strong and bold animal, and a good but slow climber on walls or trees; it burrows with great facility, throwing the earth backward with the fore paws like a dog.

RATIO. See Proportion.

RATIONALISM. See German Theology.

RATISBON (Ger. *Regensburg*; anc. *Ratisbona*), a town of Bavaria, capital of the Upper Palatinate, situated on the right bank of the Danube, opposite its junction with the Regen, 65 m. N. N. E. from Munich; pop. in 1858, 26,656. The Danube is here crossed by an old stone bridge about 1,100 feet long. Ratisbon is a very ancient town, surrounded by dilapidated ramparts and entered by 6 gates. The cathedral is one of the finest Gothic churches in Germany; it was founded in 1275, but the greater part of it appears to have been constructed in the 15th century. Adjoining the cathedral there are two older churches, one, now used as a baptistery, is supposed to date from the 10th or 11th century, and the other to be still more ancient. A massive square tower stands near the cathedral, supposed to be a remnant of an ancient Roman fortress. The manufactures are of considerable importance, and include cotton, paper, earthenware, steel, iron, &c. Ship building is extensively carried on. Ratisbon formerly enjoyed the exclusive right of the navigation of the Danube between Ulm and Vienna, but this privilege has been abolished. At Donaustauf, on the Danube, about 6 m. from Ratisbon, is the Walhalla, a Doric marble temple built after the model of the Parthenon at Athens, for the reception of statues and busts of distinguished men of Germany. King Louis of Bavaria founded it in 1830, and it was completed in 1842.—Ratisbon was a town of importance in the 2d century, and at a later period became the capital of the dukes of Bavaria. In the 12th century it became a free imperial city, and from 1663 to 1806 it was the seat of the German diet. In 1803 it was given to the archbishop of Mentz, and in 1810 it became a possession of Bavaria.

RATTAN, or **Ratan** (Javanese, *rottang; Malay*, *rotan*), the long slender leaf stalk of various species of the *calamus*, of the natural order *palmæ*, a product of the forests of the eastern archipelago, especially of the islands of Sumatra and Borneo, and the Malayan peninsula. The palm which furnishes most of the rattans of commerce is the *calamus rotang*, a bush, the slender whip-like shoots of which find a support among the foliage of other adjacent plants by means of the prickles with which their extremities are armed. The canes are largely collected for numerous useful purposes, and are exported in great quantities to almost all parts of the world, and particularly to China. Their peculiarity consists in great flexibility and strength, uniform size in lengths of 16 feet or more, and the evenness with which they may be split up into small strips, qualities which adapt them for a singular variety of uses. The eastern nations make them into chairs and other articles of furniture, baskets, sieves, &c., and also into hats and shoes. They answer as a substitute for ropes, and the Chinese thus use them with much neatness for securing tea chests, &c. They also plait them together to form mats of many varieties and serving many purposes. In the United States and Europe rattans are largely employed for the bottoms of chairs, being split into narrow strips and woven together in open work. They are also a cheap substitute for whalebone. As imported they come in bundles of 50 canes, each one about 16 feet long and bent double in the middle. The leaves and the natural epidermis or bark are stripped from them when they are collected in the forests, the method being after cutting them to draw each one quickly through a notch made for the purpose in a tree. The stems are thus left clean and naked, and protected by the hard silicious glazing with which they are coated. The best have a bright pale yellow color, of size less than a man's little finger, and cannot be broken without great difficulty. They are obtained so cheaply in Borneo, that they are sold to the Chinese junks for about 5 cents per hundred. In Bengal and in China they are disposed of by the picul or by weight at a large advance.

RATTLESNAKE, a well known American venomous serpent, the type of the family *crotalidæ*, which includes several species, all characterized by a deep pit lined with small plates on each side, beneath and usually a little behind the nostrils. In the genus *crotalus* (Linn.) the head is very large, flattened above and triangular, scaly on the crown, with small shields on its sides and the nose; eyes large and brilliant; teeth very small, but the true maxillaries, which are small and attached to the cranium by a small pedicel and by ligamentary union, have a single pair of long curved fangs, laid flat during inaction, but erected when the mouth is opened; these fangs are channelled for the conveyance of the poison secreted by a gland on each side of the head, beneath and behind the eyes; behind the fangs are the rudiments of others, which are developed as occasion requires; there are also 2 rows of small fixed teeth on the palate; the belly is covered with broad shields; the trunk and tail are scaly above, and nearly all the subcaudal scutes simple. The last 3 to 8 caudal vertebræ coalesce to form a single terminal conical and compressed bone, covered by muscle and a thick spongy skin which secretes the pieces of the rattle, an appendage of loosely articulated horny segments, whose rattling noise has given the popular name to this genus; the rattle may consist of 20 or 30 pieces, the smallest at the end; they are securely strung together, each consisting of 3 annular portions, the basal ring of one grasping the 2d of the preceding, and this again enclosing the 3d of the joint next the one preceding, all that is visible of the rattle externally being the surface of the basal projecting ring of each joint; the first only has a vital connection with the skin; this apparatus is made to vibrate by the muscles of the tail, with a quivering motion and a sound resembling that of peas shaken in a dry pod. It is popularly but erroneously believed that the age of the snake can be estimated by the number of the rattles; though these may increase with age, their fragility is such that many may be lost from accident; and moreover more than one may be added annually, according to the vigor, food, state of captivity, &c., of the animal; 20 are not unfrequently seen in large specimens, but it would be incorrect to conclude from these that the snake was neither more nor less than 20 years old. As the bite of these reptiles is speedily fatal to small animals, it has been generally believed that the use of the rattles is to warn animals and man of its vicinity; but, as other equally and even more dangerous species have no such apparatus, it is more likely that its use is to startle the squirrels, birds, and other creatures upon which it preys from their retreats, and bring them within the reach of its spring, or for some other purpose for its own welfare rather than the safety of man. Dangerous as they are, they rarely attack man unless provoked, and are fortunately sluggish in their movements, unable to spring except from a coil, and are disabled by slight blows. They are viviparous, the eggs being retained until hatched, and the young expelled alive; in winter they retire to holes in the ground, and there remain torpid, several intertwined with each other; they are unable to climb trees in pursuit of prey, and do not follow a retreating animal which has escaped their spring. They are said to be fond of music, like many other serpents. Some Indian tribes hold them in great reverence, and are afraid to kill them, fearing that the spirit of the slaughtered animal will excite its living relations to avenge its death. They are capable of attaining to a considerable age, and are tenacious of life under circumstances speedily fatal to most other animals.—The most common is the banded rattlesnake (*C. durissus*, Linn.), 4 to 6 feet long, ash-colored above with irregular transverse dusky bars, confluent near the tail; vertebral line yellowish, the sides tinged with the same; the body is thick and robust and the tail short and thick; in a specimen about 4 feet long the head was 2 inches, the body 40, the tail 3½, and 9 rattles 2 inches, the greatest circumference being 6 inches; there were 177 broad abdominal plates, and 25 under the tail; in the young the tail is black. It is generally distributed throughout the United States, from lat. 45° to the gulf of Mexico, and from the Atlantic to the Mississippi and Red rivers; it preys principally on rabbits, squirrels, rats, and small birds, quietly waiting for them to come within its reach, its bite proving fatal to animals of this size in less than a minute, when the snake is in full vigor. It is now rarely met with in the northern states, except in uncultivated and rocky places, remote from dwellings; it is more common in the western states, where its fat is highly prized as an antidote to its bite, and also for rheumatic and neuralgic pains; cattle are often bitten by it, and it is the custom there to cast them and bury the wounded part in the mud, recovery rapidly taking place; this shows the comparatively little danger for a large animal, as there can be nothing curative in the application made. The diamond or water rattlesnake (*C. adamanteus*, Beauv.) is dark brown or dusky above, with a series of large rhomboidal spots continuous from head to tail; abdomen dirty yellowish white; the mouth is large, the neck small and contracted, and the body long and thick; it is the largest of the genus, and may attain a length of 8 feet; in one about 6½ feet long the head was 2¾ inches, the body 60, the tail 2½, and the rattles 3 inches; abdominal plates 172, and 25 subcaudal. It frequents damp and dark places, always near water, though not living in it; it is one of the most hideous and sullenly ferocious of the family; its range is very limited, from North Carolina to East Florida, on the sea coast. The *C. horridus* (Linn.) is a native of the warm parts of South America; it attains a length of 5 or 6 feet and the thickness of a man's wrist; the color is yellowish brown varied with *darker*, on the lower parts lighter; there are wide *lozenge*-shaped spots along the back edged with white, with light stripes and other smaller and less distinct spots on the sides; brownish black bands between the eyes, and from the top of the head along the neck. It is found only in dry, rocky, elevated regions, covered with thorns and bushes; the negroes esteem its flesh a delicacy; it often bites and destroys cattle coming near its retreat, the poison being more virulent in tropical climates. —The genus *crotalophorus* (Gray) seems to connect *crotalus* with *trigonocephalus* (copperhead), having the rattles of the former and the plates on the head of the latter. The small or ground rattlesnake (*C. miliarius*, Gray) is dark gray above, with a brownish red vertebral line interrupted by a row of subquadrate black spots margined with yellow; a double series of black spots on each side, the upper larger but less distinct, and a white streak backward from the eyes. It is generally from 16 to 18 inches long, and is common in the United States as far N. as lat. 35°, in dry places among leaves, preying on field mice and small birds; its bite is fatal to small animals, but not to man. The prairie rattlesnake (*C. tergeminus*, Say) is a little over 2 feet long; it is cinereous above, with a triple series of dark brown spots, and a double series of dusky spots below; it is fond of hiding in the holes of the prairie dog (*cynomys*), on the young of which it chiefly feeds; it occurs in the country near the Rocky mountains and the sources of the Missouri. Other species are described by Dr. Holbrook, and by Baird and Girard.—The poison gland is compressed by the temporal muscle during the act of striking; there is a very extensive communication of the glandular tissue with the vascular system, the blood vessels surrounding the secreting tubes in a capsular manner. Microscopically the poison appears as a limpid hyaline serum, with crystals of ammonio-magnesian phosphate, according to Dr. W. I. Burnett. According to Dr. Mitchell it is yellow, acid, glutinous, of a specific gravity of 1.04; devoid of taste, smell, and acridity; beginning to coagulate at 140° F., and soluble in water. It consists: 1, of an albuminoid substance, coagulable by pure alcohol but not by a heat of 212° F., called by him crotaline, the poisonous element; 2, of a non-poisonous albuminoid compound, coagulable both by heat and alcohol; 3, of a yellow coloring matter and an undetermined substance, both soluble in alcohol, traces of fatty matter and free acid-saline bodies, chlorine, and phosphates. No temperature from zero to 212°, nor acids and alkalies at moderate temperatures, nor alcohol, chlorine, nor iodine, destroy the poisonous property of the venom. This fluid is fatal even to the bitten snake; it destroys the vitality of the blood and its power of coagulation, as by a lightning stroke; it probably acts as a powerful sedative through the blood on the nervous centres; hence the best antidotes are active stimulants, especially alcohol in some form; and, *vice versa*, intoxication may be neutralized by taking this poison into the stomach in the form of pills. The poison varies in intensity according to season, climate, and vigor of the animal, being most active in tropical regions and in warm weather, when it has been long retained or the animal is greatly irritated; cold-blooded animals generally suffer little from its bite, and pigs kill and devour it with impunity and avidity, their covering of fat preventing the introduction of the poison into the circulation; its virulence is soon exhausted by rapidly succeeding bites, as has been proved by experiments on chickens and rats; as its secretion goes on for some time after death, experimenters should be careful in their manipulations about the fangs and poison apparatus. For details on the habits of these serpents, on the anatomy of the parts concerned in the secretion and expulsion of the poison, and in the infliction of the wound, and for a full enumeration of genera and species, with illustrations and copious bibliography, see a memoir in vol. xii. of the "Smithsonian Contributions to Knowledge" (1860), by S. Weir Mitchell, M.D., and an abstract of the same in the secretary's report for 1860 (8vo., Washington, 1861).—The long list of remedies considered efficacious, in various parts of the country, against the bite of the rattlesnake, indicates that the danger is not so great from it as is generally supposed. When the poison is introduced directly into a large vein, especially in the neck, groin, or armpit, the result would probably be fatal, but many cases recover under every variety of treatment; the favorable result in each case, as a matter of course, is attributed to the remedy employed, whether that be whiskey, sweet oil, rattlesnake's grease, ammonia, caustic, snakeroot, or other domestic application; the fact probably is that, though small animals, children, and persons of feeble constitution will die from the effects of the bite, large animals and vigorous men will generally recover, unless the virus be introduced directly into some large vessel near the heart. The indication is to prevent the poison from entering the circulation, by suction with the mouth or by cupping glasses, the former being perfectly safe and always practicable immediately, as the system is not affected through the mucous membranes. Ligatures around the limb, and excision and cauterization of the wound by fire, caustic, or ammonia, should be employed also; these should be practised as soon as possible, and large doses of alcoholic stimulants administered. The antidote of Bibron, a preparation of bromine, has been highly extolled. The American Indians apply cataplasms of chewed tobacco, snakeroot (*polygala senega*), button snakeroot (*liatris spicata*), pleurisy root (*asclepias tuberosa*), rattlesnake root (*prenanthes alba*), western black ash (*fraxinus juglandifolia*), water plantain (*alisma plantago*), tall speedwell (*leptandra Virginica*), and rough hawk weed (*hieracium Gronovii*).

RAUCH, Christian Daniel, a German sculptor, born in Arolsen, in the principality of Waldeck, Jan. 2, 1777, died in Berlin, Dec. 3, 1857. He was of humble origin, studied under Valentin, from whom he learned the art of carving the ordinary bass-reliefs on gravestones, and under Ruhl of Cassel. At Berlin, whither he next repaired, he was induced by poverty to accept a position as a royal domestic, which had been occupied by a deceased brother, and for a time his art studies were laid aside. But aspiring to a higher walk in life than this, he secretly undertook to model from recollection a bust of Queen Louisa. His success gained the queen's attention, and under her patronage he was sent to Dresden, and in 1804 was enabled to go to Rome to complete his education, where, aided by the advice of Canova and Thorwaldsen, he made rapid progress in his art. His first work was a portrait statue in marble of the daughter of Wilhelm von Humboldt, who was one of his earliest friends and patrons; and under the influence of the antique sculpture which surrounded him he executed two admirable bass-reliefs, "Hippolytus and Phædra" and "Mars and Venus wounded by Diomedes," beside busts of the king and queen of Prussia and other notable persons. In 1811 he visited Berlin with other artists to compete for the monument of Queen Louisa, who had died the year previous; and his design having been accepted, he returned to Italy, and for two years was exclusively employed in the execution of the celebrated recumbent statue of the queen now in the mausoleum at Charlottenburg. It made him at once famous throughout Germany, and commissions for portrait busts and statues poured in upon him. In 1815 the king of Prussia commissioned him to execute statues of Generals Scharnhorst and Bülow, and within the next 10 years he wrought with his own hands upward of 70 busts in marble, of which 20 were of colossal size, many of them portraits of eminent Germans. His forte however lay in historical monumental works, and his greatest achievements were the public statues in marble and bronze, of which almost every considerable city in Germany contains one or more. Among these were the statues of King Maximilian at Munich, of Francke at Halle, of Blücher at Breslau, of Albert Dürer at Nuremberg, of Luther at Wittenberg, of the old Polish monarchs Miecislas I. and Boleslas I. at Posen, of Goethe, Schiller, and Kant, the colossal Victory for the Walhalla near Ratisbon, &c. The crowning work of his life, however, was his colossal monument in Berlin to Frederick the Great, commenced in 1830 and inaugurated with great pomp in May, 1851. The statue of the king is an equestrian one, and the 4 sides of the lofty granite pedestal on which it is placed are covered with historical and allegorical representations in high relief—a species of sculpture in which Ranch excelled—and surrounded by detached statues of the distinguished men of his reign. Rauch's last and one of his most impressive works was a model of "Moses Praying between Aaron and Hur," on which he labored until within a few weeks of his death. As a portrait and historical sculptor he stood at the head of his profession.

RAUCH, Frederick Augustus, D.D., a German philosopher and divine, born at Kirchbracht, Hesse-Darmstadt, July 27, 1806, died March 2, 1841. He was graduated at the university of Marburg in 1827, then studied one year at Giessen, after which he was assistant teacher in a literary institution in Frankfort, and still later spent a year in the university of Heidelberg. In his 24th year he became extraordinary professor in the university of Giessen, and soon afterward ordinary professor in the university of Heidelberg. Before, however, he assumed the duties of his new appointment, he incurred the displeasure of the government by too free an expression of his political sentiments, and was obliged to seek safety in flight. He arrived in America in 1831, spent several months at Easton, Penn., in the study of the English language, and in June, 1832, was ordained to the ministry, and called to York, Penn., to take charge of a classical school in connection with the theological seminary of the German Reformed church. In 1836 he was called to the presidency of the newly founded Marshall college, Mercersburg, Penn., acting at the same time as professor of biblical literature in the theological seminary which had been removed to that place. He continued in this double office up to the time of his death. In 1840 he published his "Psychology," which has passed through several editions, and is used as a text book in mental philosophy in colleges. He had in course of preparation a work on "Christian Ethics," which he did not live to finish. A volume of his sermons, edited by the Rev. Dr. Gerhart, was published in 1856 under the title of "The Inner Life of the Christian."

RAUMER, Friedrich Ludwig Georg von, a German historian, born in Wörlitz, near Dessau, May 14, 1781. He was educated at the universities of Halle and Göttingen, began to practise law in 1801, and after having filled several offices obtained in 1810 the place of counsellor in the cabinet of the chancellor Hardenberg. He had begun his literary labors in 1806 by the publication of a work entitled "Six Dialogues on War and Commerce," and this was followed by "The British System of Taxation" (1810), "The Speeches of Æschines and Demosthenes upon the Crown" (1811), and *CCI. Emendationes ad Tabulas Genealogicas Arabum et Turcarum* (1811), which procured for him a professorship in the university of Breslau. He next published a "Manual of remarkable Passages from the Latin Historians of the Middle Ages" (Breslau, 1813), and "Autumn Journey to Venice" (2 vols., Berlin, 1816); and in 1819 he was made professor of political economy and history in the university of Berlin. He was for a long time a member of the board of censors and a member and secretary of the Berlin academy of sciences until 1847, when, in consequence of the unfavorable reception of a eulogium delivered by him upon Frederic II., he was forced to withdraw from both positions. The city of Berlin, however, elected him to the municipal council, and in 1848 sent him to the parliament at Frankfort, after which he was for a short time ambassador to Paris. In 1853 he retired from active life, and received the title of professor emeritus in the university of Berlin. Among his historical and political works are "Lectures on Ancient History" (2 vols., Leipsic, 1821); the "History of the House of Hohenstaufen and its Times" (6 vols., 1823–'5); and "History of Europe from the End of the 15th Century" (vols. i.–viii., Leipsic, 1832–'50). His "England in 1835" was translated by Mrs. Austin (3 vols., London, 1836). A collection of his minor works appeared under the title of *Vermischte Schriften* (3 vols., Leipsic, 1852–'4). He travelled in America in 1843, and wrote "America and the American People," translated by W. W. Turner (New York, 1846).

RAVAILLAC, François, the assassin of Henry IV. of France, born in Angoulême about 1578, executed May 27, 1610. He was first employed as a lawyer's clerk, and then as a schoolmaster; but having been cast into prison on account of some offences, he fell into a gloomy fanaticism. He went to Paris, and there became a member of the order of the Feuillants, but was expelled from it as a fanatic and fool, and afterward returned to Angoulême, where his unhappy state of mind manifested itself in the most intense hatred of Protestantism. With this feeling he determined to undertake the murder of Henry IV., whom he was taught to consider the great enemy of the Catholic faith. He went to Paris, but for some time had no opportunity of meeting with the king. On May 14, 1610, however, about 4 P. M., the king drove to the arsenal in order to visit Sully, who was sick, and to inspect the preparations for the crowning of the queen. When in the narrow street La Ferronnerie the carriage was obliged to stop, as the way was blocked up by market wagons. The king was sitting on the left side next to the duke of Epernon, when Ravaillac, throwing himself upon the right hind wheel, struck twice at him with a dagger. The first time he failed, but the second he plunged the knife into the heart of the king. The assassin fled, but was immediately caught with the knife in his hand, acknowledged his deed, and after a trial before the parliament of Paris was torn to pieces by horses with unexampled tortures.

RAVEN, the largest of the *corvidæ* or crow family, and the type of the genus *corvus* (Linn.). In this genus the bill is long and very strong, and arched; the nasal feathers are lengthened and reach about to the middle of the bill, and the nostrils are large, circular, and overhung behind by membrane; the gape without bristles; wings long and pointed, when closed reaching nearly to the tip of the tail and far beyond the under coverts; the 2d quill longer than the 1st, and the 3d and 4th the longest; primaries 10, the outer 4 sinuated on the inner edge; tail short and nearly even; tarsi longer than middle toe, scaled in front. The American raven (*C. carnivorus*, Bartram) is about 25 inches long with an alar extent of 50, and the bill 3 inches; the female is a little smaller, but in other respects like the male. The plumage is compact, glossy black with violet and greenish reflections; the feathers of the chin and throat, as in all ravens, are elongated, stiffened, narrow, lanceolate, and with very distinct outlines. It is found over the entire continent of North America from Labrador to the gulf of Mexico, in some places migratory, but in others (as at Lake Superior and in Canada) braving the cold of the severest winters; it is most abundant in rocky districts, near the banks of lakes and rivers, and in thinly peopled regions. It is generally seen alone or in pairs, but sometimes in small flocks after the breeding season; the flight is rapid, elevated, and protracted, often sailing for hours at a time at a great height; on the ground the gait is grave and dignified, with frequent opening of the wings. It is truly omnivorous, but by preference carnivorous, eating small animals of all kinds, eggs and young birds, carrion, dead fish, mollusks, crustaceans, insects, nuts, and berries. It is very wary and cunning, and is rarely caught in traps or shot by the hunter, but it often falls a victim to the poisoned baits set by the trappers for the fur-bearing animals. It breeds, according to latitude, between January and June, making a rude nest on inaccessible cliffs, repairing the same for years in succession; the eggs are 4 to 6, 2 inches long, light greenish blue with numerous light purple and yellowish brown blotches, especially at the larger end; incubation lasts about 3 weeks, and the young remain in the nest several weeks before they are able to fly, fed at first on the half digested food disgorged by the parents; only one brood is raised in a year, and this is bravely and successfully defended against the largest birds of prey. It is easily domesticated by kindness, and becomes much attached to its master, following him like a dog; it can be taught to imitate the human voice and to pronounce a few words with great distinctness; when irritated or wounded, it strikes savagely with bill and claws. Its flesh is tough and unfit for food; it disgorges indigestible substances, as bones, hair, and feathers, like birds of prey. Like others of the genus, this species varies much in size and proportions according to locality, those of the south, contrary to the general rule, being larger than the northern individuals of the same species; this fact has led some to think that the Colorado raven (*C. cacalotl*, Wagl.) is only a southern variety of the *C. carnivorus*, the chief differences being a slightly larger size, longer wings and tail, and a western and southern habitat exclusively. The white-necked raven (*C. cryptoleucus*, Couch), from Mexico and Texas, is about 21 inches long, with the feathers of the neck all round, back, and breast, snow-white at the base.—The European raven (*C. corax*, Linn.) very much resembles the American in size and proportions, and the two have been regarded by Audubon and others as the same; most modern naturalists, however, consider them distinct; it is about 26 inches long and 52 in alar extent. It is a very interesting bird on account of its habits, and its historical, economical, and superstitious relations; it is very grave and dignified, sagacious, courageous, and powerful; its beak is as well adapted for tearing flesh as is that of rapacious birds; though wary and distrustful, it is docile and affectionate when domesticated; it possesses an excellent memory, and a decidedly thievish disposition. The color is black, with steel-blue and purplish or violet reflections; its form is symmetrical and its proportions fine. It is proverbially long-lived, and has been known to attain the age of about 100 years; it is spread extensively over Europe, and allied species are found in Africa and Asia. It is voracious and omnivorous, but particularly fond of carrion, whether of flesh, fish, or fowl, dead from disease or accident; it will attack an animal of the size of a sheep when in a helpless or dying condition; it is said to destroy young lambs, and certainly makes great havoc among half-grown hares and rabbits, young and full-fledged birds, and eggs; on finding a carcass the first attack is upon the eyes and tongue, and then upon the abdomen to drag out the intestines; in autumn it sometimes commits serious depredations upon barley fields. The flight is at times very high, enabling them to see to a great distance, and to watch for and follow any companions which have chanced to spy their favorite food, explaining the rapid collecting of a large number in a short time; they have no special acuteness of smell, but are guided to their food by the sense of sight; the voice is a harsh and disagreeable croak. They are usually seen alone or in pairs, except when drawn together by a large carcass in the field or on the shore; the nest is made in lofty trees or in holes of inaccessible cliffs, and the same one is used year after year; a fetid odor issues from the body, probably on account of their carrion food. Farmers and shepherds like to have them breed on their premises, as they keep off eagles, cats, dogs, and similar unwelcome visitors. This was considered a bird of ill omen by the ancients, and was one whose movements were watched by the augurs with great attention; and it has been generally looked upon with superstitious fears, on account of its black hue, mournful croak, fetid odor, and disgusting habits. It by preference inhabits the most desolate places. In America, at least, there seems to be a natural antipathy between the raven and the crow; where the former abounds, as about Lake Superior, the latter is very rarely seen, and *vice versa*.

RAVENNA, a legation of the Papal States, forming part of the Romagna, which was annexed to the kingdom of Sardinia in March, 1860. It is bounded N. by the legation of Ferrara, E. by the Adriatic, S. E. by the legation of Forlì, S. and S. W. by Tuscany, and N. W. by Bologna; area, 674 sq. m.; pop. 175,994. It has a fertile soil, abounds in pasturage, and produces grain, wine, oil, and silk.—Ravenna, the capital, is situated in a marshy plain on the river Montone, a few miles from the Adriatic; pop. 24,000. The principal buildings are the cathedral, the church of Santa Maria della Rotonda, formerly the mausoleum of Theodoric, king of the Ostrogoths; the basilica of San Vitale; the churches of St. John the Baptist and St. John the Evangelist, built in the 5th century by the empress Galla Placidia; and the remains of the palace of Theodoric, occupied after him by the exarchs. Ravenna is the seat of an archbishop. The chief pursuits are the culture of the vine and the rearing of silkworms, with the spinning and weaving of silk. Ravenna was once situated on the Adriatic in the midst of marshes, but it is now some distance from the sea, the alluvial deposits and the sand thrown up by the sea having filled the lagoons and canals which surrounded and intersected the city. Between Ravenna and the sea is the *Pineta*, a remarkable forest of pines extending for many miles along the coast. This existed as early as the 6th century, and has been spoken of by Dante, Boccaccio, Dryden, and Byron.—The city appears to have been founded by the Umbrians. It is not mentioned in history until a late period of the republic, but during the civil wars between Julius Cæsar and Pompey and between Antony and Octavius it held a prominent position. Augustus raised it to still greater importance by building a new port called Portus Classis, or simply Classis, capable of containing 250 ships of war, and making it the station of the fleet guarding the Adriatic. The natural strength of its position contributed to render it an important military post, and in A. D. 404 Honorius made it the abode of the western emperors. It remained the imperial residence until the fall of the western empire, then became the capital of the Gothic kings, and was subsequently the residence of the exarchs of the Byzantine emperors, from whose title the whole province under their jurisdiction was called the exarchate of Ravenna. The city itself remained in the possession of the Greek emperors until taken by Luitprand, king of the Lombards, in 728, and again after a recapture by Astolphus, one of his successors, in 752. Luitprand destroyed the ancient port of Classis, the site of which at present is about 2 m. distant from the sea. When Pepin had conquered the Lombards he made a present of Ravenna to the pope, and with occasional interruptions it continued to belong to the states of the church until 1860. From 1440 to 1508 it was in the hands of the Venetians, but the league of Cambray placed it again under papal power. It is celebrated for the great victory gained under its walls by the French under Gaston de Foix over the Spaniards and the troops of Pope Julius II., April 11, 1512.

RAVENSCROFT, John Stark, an American clergyman, and bishop of the Protestant Episcopal church, born near Blandford, Prince George co., Va., in 1772, died March 5, 1830. Shortly after his birth his father removed to Scotland, where and in the north of England the son was educated. When 17 years old he returned to Virginia, and with the design of studying law entered William and Mary college. In 1792 he revisited Scotland, and after his return lived for 18 years in Lunenburg co., Va., and while there he never even opened a Bible. In 1810, however, he joined a society called "Republican Methodists;" and in 1816 he was licensed as a lay reader in the Protestant Episcopal church. In 1817 he was ordained as priest, and became minister of St. James parish in Mecklenburg co. In 1823 he was elected bishop of the diocese of North Carolina, and with it took the pastoral charge of the congregation at Raleigh, which he gave up in 1828 and took charge of the church at Williamsborough. In 1829 he was relieved from all parochial care, but died soon after. He published during his lifetime several sermons, which after his death were republished, along with 61 others selected by him for publication, in 2 vols. 8vo., with a memoir of his life.

RAVIGNAN, Gustave Xavier de, a French preacher and author, born in Bayonne, Dec. 1, 1795, died in Paris, Feb. 26, 1858. He sprang from an illustrious family, and after completing his studies at the *lycée Napoléon* at Paris, was offered a place at the emperor's court, which he refused. He studied law until the schools were closed in consequence of political events, after which he went to Bordeaux (1814), espoused the cause of the Bourbons, and on the reappearance of Napoleon joined the army. Having distinguished himself at the battle of Behobie by his efforts to save the life of his commanding officer at the risk of his own, he received the rank of lieutenant of cavalry. At the close of the war he returned to Paris, resigned his commission, and resumed his legal studies. His admission to the bar was soon followed by his appointment as assistant auditor of the supreme court of Paris, and a brilliant career was just opening before him when in 1822 he resolved to devote himself to the church, entering for this purpose the seminary of St. Sulpice at Issy. In the same year he became a member of the society of Jesus. After having taught dogmatic theology for several years to the younger Jesuits, at first in France and afterward in Switzerland, he succeeded the Dominican preacher Father Lacordaire in the pulpit of the cathedral of Notre Dame at Paris in 1837. The sermons or "conferences" which he delivered there during Lent from 1837 to 1846 gave him a great name as a preacher, and many of them have been published. In 1837 he also opened a house of his order at Bordeaux, and was its superior for 5 years, after which he resided permanently in Paris. He took an active part in the struggle between the Jesuits and the university, chiefly on the subject of education, and to defend the society from the attacks of Michelet, Quinet, and others, wrote his little work *De l'existence et de l'institut des Jésuites* (8vo., 1844; 7th ed. enlarged, 1855), which led to an animated controversy. During the latter 10 years of his life he was engaged in a very extensive correspondence with many of the leading men of Europe. He preached on Sundays in the chapel of the Tuileries, and in 1851 visited London and preached in French during the great exhibition. After that he lived chiefly in retirement, his health forbidding a continuance of the active labors in which he had been engaged. Beside a series of articles in a religious journal in defence of the immaculate conception, he published *Conférence prêchée à Toulouse* (8vo., 1845) and *Clément XIII. et Clément XIV.* The last named work is a history of the suppression of the Jesuits, written to counteract the book of the Theatine Father Theiner on the same subject.

RAWDON, Lord. See Hastings, Francis.

RAWLE, William, an American lawyer, born in Philadelphia in 1759, died April 12, 1836. He was educated at the academy of the society of Friends in his native city, studied law in New York, London, and Paris, and commenced practice in Philadelphia in 1783. In 1789 he was elected to the Pennsylvania legislature, and was subsequently appointed U. S. district attorney for that state by President Washington. He was the first president of the Pennsylvania historical society, to whose published collections he made frequent contributions. In 1822 he was chosen chancellor of the associate members of the bar of Philadelphia, which body published several discourses delivered by him. He wrote "A View of the Constitution of the United States" (1829).

RAWLINSON, Sir Henry Creswicke, an English archæologist, born in Chaddington, Oxfordshire, in 1810. He was educated at Ealing in Middlesex, and at the age of 16 entered the military service of the East India company, and served with the troops of the Bombay presidency until 1833, when in common with several English officers he joined the army of the shah of Persia, holding in it the rank of major. In 1835, while stationed at Kermanshah, he began his study of the cuneiform inscriptions, visited Bagdad in 1836, travelled in Luristan and Susiana, went with the Persian army to the frontier, and subsequently returned to Kermanshah. In 1837–'8, while stationed at Teheran, he communicated to the royal Asiatic society of London announcements of his cuneiform discoveries, and published an account of his travels in Susiana in the "Geographical Society's Journal." While at Bagdad in 1839 he wrote for the same journal a paper on Ecbatana, and at the next anniversary meeting obtained for it the gold medal of the society. In the same year he also forwarded a translation of most of the Behistun inscriptions, a part of which were published in Sept. 1846, and the remainder in Dec. 1847. The breaking out of the Afghan war occasioned his recall, and after travelling through Sinde to Candahar and thence to Cabool, where he was associated with Capt. Arthur Conolly in the mission to Khiva, Bokhara, and Kokand, he was transferred to Candahar, in which place he remained as political agent until the end of 1842. In 1843 he went to Bagdad as political resident, and in 1844 was made British consul, and in 1851 consul-general, and was also promoted to the rank of lieutenant-colonel. With the exception of a visit to England in 1850–'51, he resided constantly at Bagdad until 1855, prosecuting diligently his study of the cuneiform characters and of the oriental tongues. He published the processes of his investigations in numerous papers in the "Journal of the Royal Asiatic Society," and many of their results are embodied in notes and essays to the translation of Herodotus made by his brother, the Rev. George Rawlinson, of Oxford. Returning to England, he was appointed a crown director of the East India company in 1856, and created knight commander of the bath. In Jan. 1858 he was elected to parliament from Reigate, but on the extinction of the East India company was appointed a member of the council of India, and in consequence was obliged to give up his seat. In April, 1859, he was made envoy extraordinary and minister plenipotentiary to the court of Persia, and is now residing at Teheran. His present rank in the army is that of major-general. Beside his numerous contributions to scientific periodicals, he has published "Outline of the History of Assyria, as collected from the Inscriptions discovered by A. H. Layard in the Ruins of Nineveh; printed from the Journal of the Asiatic Society" (London, 1852), and "Memorandum on the Publication of the Cuneiform Inscriptions" (1855), and edited a collection of cuneiform inscriptions (folio) from the originals in the British museum.—**George,** an English clergyman, brother of the preceding, was graduated at Oxford, and became a fellow and tutor of Exeter college. He was Bampton lecturer in 1859; his lectures were published, entitled "Historical Evidence for the Truth of Christian Records" (London, 1860). He has also published "Christianity and Heathenism" (1861), and, in connection with Sir H. C. Rawlinson and Sir J. G. Wilkinson, has prepared an annotated edition of Herodotus (4 vols., London, 1858–'60). He is now (1861) engaged on a historical work called "The Five Great Monarchies of the Ancient World, Chaldea, Assyria, Babylonia, Media, and Persia," to form 3 vols. 8vo.

RAY, the name of the plagiostome, chondropterygian, or cartilaginous fishes of the sub-order *raiæ*, popularly called skates. The numerous families are characterized by great flatness and width of the body, the latter arising principally from the extreme expansion of the pectoral fins; the skull is flat, the upper wall generally membranous, and movably articulated, as in sharks, by 2 condyles and an intervening space with the spine; anteriorly the head ends in a tapering cartilage which supports the snout; spout holes and eyes on the dorsal aspect, the latter without lids or with an upper adherent one; on the ventral surface are 5 slit-like gill openings, before the ventrals and under the pectorals; the scapular arch is complete above and below, supporting the long, jointed, cartilaginous rays of the pectorals; between this and the pelvic arch, supporting the ventrals, lie the abdominal viscera, and between it and the narrow skull are the branchial apparatus and the vascular centres. In the torpedos the cellular galvanic batteries occupy the spaces between the skull and the pectorals; and a homologous rudimentary apparatus has been found in the tail of common skates, showing the adherence to a general plan of structure irrespective of function. The tail in some is fleshy and tapering, in others slender and cartilaginous, in others elongated like a whip lash, and in others armed with lancet-shaped spines on the upper surface, forming a very formidable weapon. The gills consist of membranous folds on plane surfaces, and the arterial bulb has from 3 to 5 transverse rows of semilunar valves. The reproductive secreting organs are of a compact and oblong form, the efferent tubes communicating with the ureters and ending in a rudimentary organ in the cloaca; the claspers are present in the males, as appendages to the posterior edge of the anal fin, furrowed toward the end, leading to a blind subcutaneous sac well lubricated with mucus and the secretion of a glandular body; the ovaries are comparatively small, and the ova are larger and fewer than in common fishes, and more as in birds; most of the genera are viviparous, but some of the genus *raia* are oviparous. The claspers are probably something more than organs of prehension; they may be so rotated as to bring an opening in them opposite to the spermatic duct, and may, according to Agassiz ("Proceedings of the Boston Society of Natural History," vol. vi. p. 377, May, 1858), be introduced into the oviducts, and reach the glands there situated for the formation of the egg case. The egg cases of the skate are often seen on our beaches after a storm; they are of a quadrangular form, about two inches by one, of a brown color and leathery consistence, each corner prolonged into a tubular process; they look somewhat like pillow cases, and are often called sailors' purses (being usually found empty) and skates' barrows. The young within the egg has no investing membrane, and the yolk seems to bear no relation in size to that of the embryo; water for the purpose of respiration is admitted and ejected through the corner prolongations, and the young fish escapes through a transverse fissure at one end. The horny egg case may be formed by each oviduct, and is surrounded by a glandular enlargement which secretes its materials; it is formed before the egg descends into it, in the shape of a pocket open above for the reception of the egg, which must be impregnated in the ovary, contrary to the usual order of things, in which the yolk is enclosed before the shell is formed; as the eggs are found to be of different sizes and various degrees of development in the ovary, it is probable that several years are required for their maturity; these peculiarities show the propriety of placing the skates (with the sharks forming the division of selachians of Aristotle and Agassiz) in a class by themselves. The teeth of the rays are generally tubercular, in close quincunx order like a mosaic pavement. Disgusting as is the form of the rays, their flesh is esteemed a delicacy in England and France, though it is rarely eaten in America except by those of European origin; it is tough when first caught, but becomes tender by being kept several days; with us it is most commonly used as bait for lobster pots, or for manure. Of the families of rays, the *pristidæ* and *torpedinidæ* will be described under SAWFISH and TORPEDO respectively; the *cephalopteridæ* have been noticed under DEVIL FISH.—The family *rhinobatidæ* are intermediate between sharks and rays, having the form of body, position of fins, thick fleshy tail, and smallness of pectorals of the former; the anterior part of the body forms a disk by the union of the pectoral fins with the snout, the latter divided from the former by a furrow, whence these have been called beaked rays; the 1st dorsal is over the ventrals; the caudal bilobed, with the upper lobe the larger, and the keel of the sides continued along it; margins of mouth generally undulated, 3 protuberances of the under jaw fitting into corresponding indentations in the upper; nostrils longitudinal near the mouth, with flaps.—In the family *raiidæ* or the typical rays, the snout is more or less pointed, the disk of the body and pectorals usually of a rhombic figure; tail slender, with 2 small dorsals near the end and sometimes a caudal; spout holes near the eyes; mouth curved, with the convexity forward; teeth of males with a central cusp in spawning time; skin either smooth or studded with prickles pointing backward, sometimes with spines on the dorsal ridge and sides of tail. This family includes the genus *raia* (Cuv.), with about 30 species, embracing the best known in America and in Europe, and such as are commonly eaten in the latter. The smooth ray or common skate of the northern coast of America is the *raia lævis* (Mitch.); it is of a uniform light brownish color above, and dingy white below; the female is marked above with blackish spots; it attains a length of from 3 to 5 feet, and a weight of 200 lbs.; it is found from New York to the British provinces; the body is generally smooth, but there are small spines about the orbits, on the anterior edge of the pectorals, and on the tail; the snout is blunt, and the teeth in compact rows, 6-sided and nearly smooth. Its flat form is peculiarly adapted for life on or near the bottom; the usual mode of progression is by a gentle undulating movement of the pectorals, intermediate between flying and swimming; when in pursuit of prey or escaping from its enemies, the motions are rapid. The young are produced twice a year, in spring and in autumn, deposited in thin, horny, nearly quadrangular cases. Its flesh is said by Mr. Perley to be extensively consumed, and the fleshy part of the pectorals to be beautifully white and delicate; it is usually dressed in long thin slips, rolled like ribbon. On the coast of New England, Nova Scotia, and New Brunswick, it is frequently taken, and of large size, by the cod fishers, being generally hooked by its pectorals; it is pulled up like a dead weight to near the surface, unless caught by the mouth or head, and struggles violently on being drawn out. It feeds on fish, crustaceans, and mollusks, and is very voracious; it digs up clams with its powerful spade-like snout, crushing them easily with its rolling flattened teeth. The skin is covered with an abundant tenacious slime, so dirtying their boats that fishermen ordinarily bring them to the surface, beat them over the head, and cut them loose to sink. There are 8 or 9 species in European waters, some attaining a weight of 200 lbs. The sharp-nosed ray (*R. oxyrhyncha*, Linn.) attains a length of 6 feet; this is the favorite species in the French markets. The common skate or ray (*R. batis*, Linn.) is a large species, with a granulated skin above; the color is brown above, cinereous below or grayish white with black specks. Several species are common in the London market, where the females are known as maids.—In the family *trygonidæ* or sting rays the tail is slender, often whip-like, naked or bearing one or more barbed spines; no caudal fin; pectorals large, uniting in front of the head; spout holes large and close behind the eyes; teeth small, transversely elliptical, and ridged; skin either smooth or prickly, but without prickles on the pectorals. The genus *trygon* (Adans.) is the most numerous in species. The American whip sting ray (*T. hastatus*, De Kay) occurs on the coast of the middle states, in Long Island sound, and sometimes on the coast of Massachusetts; it is olive brown above, and white below; it attains a length of 5 to 8 feet, including the tail. It is not uncommon on the shores of New Jersey, where it is caught both by hook and seine, varying in size from a breakfast plate to a width of 4 feet and a tail of 5; the fishermen always cut off the tail at once, to prevent wounds from its spines, which, being serrated, produce extensive lacerations accompanied by severe inflammation. The principal use made of this species, and indeed of all the rays in this country, is to extract the oil from the liver, which, with that from this organ in sharks, is employed for various domestic and medicinal purposes. The European sting ray (*T. pastinaca*, Bonap.) is common in the Mediterranean and on the southern Atlantic coast; it was well known to the ancients, who thought it capable of inflicting poisoned wounds; it twists its long tail around its prey or its enemies, causing very severe lacerated wounds; its flesh is not eatable. The spines of some of the species of this genus are employed by savages as arrow and spear heads.—In the family *myliobatidæ* or eagle rays, the head is more elevated than in the other families, projecting as far as the gills, without fin rays on its sides, but with a kind of cephalic fin in front of the skull making the point of the disk; the pectorals are very large and wing-like; the tail is long and slender, with a small dorsal and strong spine; the mouth is transverse, with the dental plates reaching far back into the cavity of the mouth; the teeth are like a mosaic pavement, large and even, in several rows forming a convex surface; the eyes and spout holes are on the sides of the head, and a broad ridge runs between the two; the interrupted pectorals on the sides of the head are a family character. In the genus *myliobatis* (Cuv.) the nasal membrane is square, and the pectorals end in an angular projection; the teeth form long hexagonal plates in the middle, with 2 or 3 short or equal rows on the sides. The *M. acuta* (Ayres) is found on the Massachusetts coast and in Long Island sound and attains a length of about 4 feet; the body is smooth and reddish brown above, whitish below; tail very slender and armed with spines. The eagle ray of the Mediterranean (*M. aquila*, Risso) grows to a large size; the wounds made by its spines are so dreaded by the fishermen that the tail is cut off as soon as possible. Several species are found in the seas of the warm parts of the globe. In *rhinoptera* (Kuhl) the nasal membrane is notched; the central teeth are the largest, the 3 lateral rows growing smaller and smaller externally. In *aëtobatis* (Müll.) the nasal membrane is lobed, which would embrace many species of *rhinoptera* as usually defined, and the pectorals are rounded; the teeth form a single row of simple arched plates, without lateral rows. In *zygobatis* (Ag.) the nasal lobes and the pectorals are as in the preceding genus; the central rows of teeth are much the longest, the 1st lateral about half as large, and the 2 external very much smaller. In *goniobatis* (Ag.) the palate is broadest behind, and the plates are obtusely angular, with their rounded edges forward.—There is hardly a family of fishes in the classification of which more confusion reigns than that of the rays; naturalists see them only in rare instances, and almost always single specimens at a time; there can be little doubt that the two sexes of the same species have in some instances been made into distinct species. Even our most common rays are very imperfectly known, and the genus *raia* embraces many species which are not congeners.

RAY, a N. W. co. of Mo., bordered S. by the Missouri river; area, about 570 sq. m.; pop. in 1860, 14,091, of whom 2,047 were slaves. It has an undulating surface, covered by forests and prairies, and a generally fertile soil. The productions in 1850 were 605,020 bushels of Indian corn, 46,003 of wheat, 138,641 of oats, 216,000 lbs. of tobacco, 27,277 of wool, 185,137 of butter, and 431 tons of hemp. There were 8 saw mills, 2 tanneries, 8 churches, and 500 pupils in public schools. Capital, Richmond.

RAY, Isaac, M.D., an American physician, born in Beverly, Mass., in Jan. 1807. He was graduated at the Harvard medical school, Boston, and commenced the practice of medicine in Portland, Me., in 1827. In 1829 he removed to Eastport, Me., where he studied the science and literature of insanity, and prepared his treatise on the "Medical Jurisprudence of Insanity" (1838). In 1841 he was appointed superintendent of the state insane hospital at Augusta, where he remained till 1845, when he was chosen superintendent of the newly established Butler hospital for the insane, at Providence, R. I. He is still the head of that institution. Dr. Ray has been a frequent contributor to medical and literary periodicals.

RAY, John (or Wray, as he at one time spelled his name), an English naturalist, born near Braintree, Essex, in 1627, died in 1704. He was the son of a blacksmith, and was graduated at Trinity college, Cambridge, in which he obtained a fellowship in 1649, the professorship of Greek in 1650, and a mathematical tutorship in 1652. His health being impaired, he travelled over the greater part of England, Wales, and Scotland, studying their botany and zoology. At the restoration he took orders, but never held any church preferment, and two years later resigned his fellowship, as he could not conscientiously subscribe to the act of uniformity. After this he resided chiefly with one of his former pupils, Francis Willughby, at Middleton hall, in Warwickshire, devoted to the study of natural history. From 1663 to 1666 he travelled with Mr. Willughby on the continent, and published an account of this tour in 1673. In 1667 he was elected a fellow of the royal society. Among his most important works are: *Catalogus Plantarum Angliæ* (1670), the foundation of all English floras; *Methodus Plantarum Nova* (1682), in which he proposed a new method of classification, which, as subsequently altered and amended by himself, formed the basis of the method of Jussieu; and *Historia Plantarum* (3 vols., 1686-1704), his largest botanical work. He edited Willughby's works on the animal kingdom, and published several of his own, which were regarded by Cuvier as "the foundation of modern zoology." Of his other writings, his "Collection of English Proverbs" (1671) has passed through many editions, and was reprinted with additions by H. G. Bohn (London, 1850).

RAYMOND, Henry Jarvis, an American journalist, founder of the "New York Times," born in Lima, Livingston co., N. Y., Jan. 24, 1820. His father was the proprietor of a small farm, in the labors of which the son was early employed. While still young he entered the academy of Lima, and in the winter of 1835-'6 taught a district school. He was graduated at the university of Vermont in 1840, and repairing to New York, studied law for a year in the office of Mr. Edward W. Marsh, maintaining himself by teaching the classics in a young ladies' seminary, and by contributions to the "New Yorker," a literary journal. When, in April, 1841, the "New York Tribune" was established, Mr. Raymond became connected with it as assistant editor, and in that capacity greatly distinguished himself by extraordinary success in reporting, an art then comparatively little practised in America. In 1843 he accepted an offer from Mr. James Watson Webb of a position on the staff of the "New York Courier and Enquirer," which he relinquished in 1851, in consequence of a political disagreement with Mr. Webb. He had also, some 4 years before, formed a literary connection with the publishing house of Harper and brothers, which continued 10 years. During this period he had a prolonged controversy with Mr. Horace Greeley, in the columns of their respective journals, upon the principles of socialism, especially as taught by Fourier, Mr. Raymond attacking and Mr. Greeley defending them; the successive articles on each side attracted much attention, and were afterward published in a pamphlet. In 1849 Mr. Raymond was elected by the whigs of his district to the state legislature, where he soon became prominent as a debater and a practical legislator. He was reëlected in 1850, when he was chosen speaker of the assembly, and during this session manifested special interest in the common school system and the canal policy of the state. After its adjournment he sailed for Europe for the benefit of his health, returning in August, and publishing a little later (Sept. 18, 1851) the first number of the "New York Times" daily journal. In 1852, in the capacity of substitute for a regular delegate to the whig national convention at Baltimore, he addressed that body at length, in spite of a very violent and stormy opposition, in exposition of northern sentiment. In 1854, under nominations by the whig, anti-Nebraska, and temperance conventions, he was elected lieutenant-governor of the state by a large majority over two opponents. He took an active share in the organization of the republican party, consequent on the repeal of the Missouri compromise, and drew up the "Address to the People" promulgated by its first national convention, held at Pittsburg in Feb. 1856; and during the succeeding presidential canvass he made numerous public speeches in support of its candidate, Mr. Fremont. Since the close of his term as lieutenant-governor, Dec. 31, 1857, Mr. Raymond has held no office, having declined in that year to be a candidate for governor of the state. In the presidential canvass of 1860 he again took a prominent stand, both in his journal and in public addresses, in favor of the republican candidate, Mr. Lincoln; and by the same modes he has in 1861 warmly supported the war against the seceding states.

RAYNAL, Guillaume Thomas François, known as the abbé, a French philosopher and author, born at St. Geniez, Guienne, in March, 1711, died in Paris, March 6, 1796. He was educated at a college of the Jesuits, became a priest, and for some time taught theology and preached in his native province. Ambition and restlessness of temper induced him in 1747 to repair to Paris, where he became an assistant clergyman at the church of St. Sulpice. His provincial accent was an insuperable obstacle to his success in the metropolitan pulpit, and, disappointed in his anticipations, he soon gave up the ministry, associated with the "philosophers," and became director of the *Mercure de France*, then a very successful periodical. He published various historical works, and, with the assistance of Diderot and others, prepared anonymously a *Histoire philosophique et politique des établissements et du commerce des Européens dans les deux Indes* (4 vols. 8vo., 1770), which was favorably received and for about 10 years circulated freely without being noticed as objectionable. In a second edition, however, he introduced attacks upon religion and government so openly that the work was interdicted on Dec. 19, 1779; and when the edition appeared under his name at Geneva (10 vols. 8vo. and 5 vols. 4to. with an atlas, 1780), a warrant was issued for his arrest, which he avoided by leaving France; and the parliament ordered his book to be burned by the hand of the executioner (May 25, 1781). In the same year he published his *Tableau et révolutions des colonies Anglaises dans l'Amérique septentrionale* (2 vols. 12mo.), which was immediately translated into English. Its blunders were at once pointed out in a pamphlet by Thomas Paine. For several years Raynal wandered in foreign countries, and was finally permitted to return home in 1788. He was elected a deputy to the states-general by the city of Marseilles, but declined the honor on account of his age. His friend Malouet, who was chosen in his place, succeeded in 1790 in having the sentence of the parliament against his *Histoire philosophique* reversed. The next year Raynal addressed to the president of the constituent assembly an eloquent letter recanting his former principles, and insisting upon the necessity of investing the king with more ample powers than were left to him by the new constitution. His chief work is now fallen into oblivion. The English translation by Justamond was published in 1776 (3 vols., London) and in 1783 (8 vols.).

RAYNOUARD, François Juste Marie, a French dramatic and miscellaneous author, born in Brignolles, Provence, Sept. 18, 1761, died at Passy, near Paris, Oct. 27, 1836. He was by profession a lawyer. Elected an assistant deputy to the convention, he sided with the Girondists, and on their fall was thrown into prison, from which he was released by the revolution of Thermidor. In 1803 he obtained a prize at the French academy for a poem entitled *La vertu nécessaire dans les républiques*, and in the following year another for *Socrate dans le temple d'Aglaure.* In 1805 his 5-act tragedy *Les templiers* created an unparalleled sensation; the piece was recommended by the institute for one of the decennial prizes, but Napoleon, being displeased with the author's *États de Blois*, played at St. Cloud in 1810, disregarded their advice. The academy meanwhile elected him a member in 1807. In 1806 he had been elected by his native department a deputy to the legislative body, where in 1813 he was chosen one of the committee of 5 to whom were referred some demands made by the emperor. The report, mostly drawn up by Raynouard, though presented by Lainé, severely condemned Napoleon's warlike policy, and, instead of recommending subsidies, insisted upon the grant of enlarged political liberties. Napoleon caused the report to be suppressed, and immediately adjourned the chambers. During the Hundred Days Raynouard was offered the title of councillor of the university and the post of minister of justice, both of which he declined. He now applied himself to the study of the Provençal language, and published *Choix des poésies originales des troubadours* (6 vols. 8vo., Paris, 1816–'24). His *Lexique Roman, ou Dictionnaire de la langue des troubadours, comparée aux autres langues de l'Europe Latine*, was posthumously published (6 vols. 8vo., 1838–'44). He was elected perpetual secretary of the French academy in 1817.

RAZOR. See Cutlery.

RAZOR FISH (*xyrichthys*, Val.), an acanthopterygian genus belonging to the family of *cyclolabridæ*. The body is compressed and covered with large scales, the lateral line interrupted; the profile is almost vertical, the forehead trenchant, and the eyes high up; the sharpness of the head is not owing to the interparietal crest as in *coryphæna* (the dolphin of sailors), but to the ethmoid and intermaxillaries growing directly downward, the lower jaw being horizontal and of ordinary length; the cheeks are scaleless, and the snout smooth and blunt; the dorsal is long and of uniform height; the teeth are in one row, conical, largest in the middle; the palate and tongue are smooth, but the pharynx is furnished with small and pavement-like teeth; the intestinal tube is simple, without stomachal dilatation and pancreatic cæca; the air bladder is large, pointed in front. The type of the genus is the razor fish of the Mediterranean (*X. cultratus*, Val.); it is about 8 inches long, of a reddish color, variously striped with bluish; its flesh is highly esteemed as a delicate food; it lives solitary, on sandy bottoms near the shores, feeding on such fish and mollusks as its very small mouth enables it to swallow.

About a dozen other species, of the same size, are found in the East and West Indies, among the Pacific islands, and on the coast of South America, where their flesh is eaten; in some the 3 anterior rays of the dorsal are detached and placed far forward, forming 2 dorsals.

RAZOR SHELL (*solen*, Linn.), the type of the lamellibranchiate family of *solenidæ*. The genus is characterized by 2 adductor muscles, the mantle open anteriorly and produced into 2 short united siphons, the branchiæ attached to the lower; the foot is long and club-shaped; the shells are elongated, equivalve, and gaping at both ends; the hinge has 2 or 3 compressed teeth in each valve, and is nearly terminal; the ligament is long and external. The common razor shell of our coast is the *S. ensis* (Linn.), of a scabbard shape, about 6 inches long and one inch high, with rounded ends, white within and covered outside by a glossy yellowish or brownish green epidermis. It is found on sandy beaches near low water mark, where it burrows beneath the surface, whence it is sometimes displaced by storms; it descends into the sand with astonishing rapidity; the animal is cylindrical, longer than the shell, and is often used as food under the names of long clam, knife handle, and razor fish. The *S. siliqua* and *S. curtus* of Europe have similar habits, sinking vertically in the sand, foot downward; their burrows are sometimes 2 feet deep, and they ascend and descend in them very quickly by widening or narrowing the foot. They are used as food, and as bait for cod and haddock; their burrows may be known by small orifices like keyholes, into which the fishermen put a little salt; this so irritates the tubes that the animal ascends near the surface, and is dragged out by an iron hook; when taken from their holes, they will, if possible, again rapidly bury themselves. They are found in almost all known seas.

RAZZI, Giovanni Antonio, called Il Sodoma, an Italian painter, born in Vercelli, Piedmont, in 1479, died in 1554. He formed his style on that of Leonardo da Vinci, and in the early part of the 16th century was employed by Pope Julius II. to execute a series of works in the Vatican, which were afterward in part obliterated to make room for the frescoes of Raphael.

REACH, Angus Bethune, a British journalist and author, born in Inverness, Scotland, Jan. 23, 1821, died Nov. 25, 1856. He became about 1850 a reporter on the staff of the London "Morning Chronicle," and was afterward for several years a fertile writer for that journal. He composed much for the stage and for the magazines, and published several works, among which are "Claret and Olives: from the Garonne and the Rhone," an account of a journey in the south of France, and two romances, "Clement Lorimer" and "Leonard Lindsay," a story of a buccaneer.

READ, George, one of the signers of the declaration of independence, born in Cecil co., Md., in 1734, died in 1798. He was the son of a planter, studied law at Philadelphia, was admitted to the bar at the age of 19, commenced the practice of his profession at New Castle, Del., and in 1763 was appointed attorney-general for the 3 lower counties on the Delaware, the designation by which the present state of Delaware was then known. In 1774 he was elected to congress, of which he continued to be a member, with a brief interval, till near the close of the revolution. When the question of independence was first agitated, Mr. Read opposed it as premature, but was afterward among its most zealous supporters. In 1776 he was president of the convention that formed the first constitution of Delaware, under which he was chosen vice-president, and served for a short time as president during the captivity of the regular incumbent. In 1782 he was made judge of the U. S. court of appeals in admiralty cases. He represented Delaware in the convention that framed the constitution of the United States, and was the first senator chosen under it for that state. He retained his seat in the senate till, in 1793, he was made chief justice of Delaware.

READ, Nathan, an American inventor, born at Warren, Worcester co., Mass., July 2, 1759, died near Belfast, Me., Jan. 20, 1849. He was graduated at Harvard college in 1781, and was tutor there for 4 years. In 1796 he established, with others, the Salem iron foundery, and invented a machine, patented in Jan. 1798, for cutting and heading nails at one operation. In 1800 he became a member of congress. In 1807 he removed to Belfast, Me., and for many years was chief justice in the court of Hancock co. In 1788 Mr. Read's attention was directed toward adapting the steam engine for propelling boats and carriages, by devising some lighter and more compact machinery than Fitch was then experimenting with. Pursuing substantially the same course which Fulton afterward followed, he first invented, as a substitute for the great working beam, the cross head, running in guides, with a connecting rod to communicate the motion, which was adopted by Fulton in his second boat, the Car of Neptune. The "new invented cylinder," as he calls it, to which this "working frame" was attached, was a double-acting cylinder, like Watt's last improvement, with which Read does not seem to have been acquainted. To render the boiler more portable, Read invented the multitubular form, which was patented with the cylinder, chain wheel, &c., Aug. 26, 1791. This boiler was either horizontal or upright, cylindrical, and contained the furnace within itself. A double cylinder formed a water jacket, connecting with a water and steam chamber above, and a narrow water chamber below. A number of small straight tubes parallel to the axis of the boiler, and about ⅔ its length, also connected these chambers; while the central tubes, being closed at the bottom, and not reaching quite to the bottom of the boiler, left a space for the fire, which passed around instead of through the tubes. The smoke pipe passed through a reservoir above the boiler, partly heating the water before it entered the boiler. The rise of the heated water would create a constant current through the tubes. Although this form of boiler is perhaps inferior to those with fire tubes, in cases where, as in locomotives, a very strong draught is attainable, it is yet coming into extensive use in marine engines, being recommended by its small consumption of fuel and greater freedom from incrustration. Read also invented another form of boiler, in which the fire passed through small spiral tubes on the principle of the present locomotive boiler, an arrangement which, he remarks, would have the advantage of consuming the smoke. Beside these, he had several other forms, with numerous apartments, to which the water was to be gradually admitted, as fast as evaporated. As a means of communicating motion to his steamboat, his first plan was to use paddle wheels; but finding that these had been used before, he substituted a chain wheel of his own invention. He regarded the former however as the best, and to try their power he caused a small boat to be fitted with paddle wheels and cranks, with which he made experiments on Porter's river at Danvers, Mass., in 1789. Read also planned a steam carriage, which, with his tubular boiler, he asserted could be made to move at the rate of 5 miles an hour with a load of 50 tons. He also invented a method of equalizing the action of wind mills, by accumulating the force of the wind by winding up a weight; a plan of using the force of the tide by means of reservoirs alternately filled and emptied in such a way as to produce a constant stream; different forms of pumping engines and threshing machines; and a plan for using the expansion and contraction of metals, multiplied by levers, for winding up clocks and other purposes.

READ, Thomas Buchanan, an American painter and poet, born in Chester co., Penn., March 12, 1822. At the age of 17 he went to Cincinnati, and entered a sculptor's studio, but soon after devoted himself to painting. In 1841 he removed to New York, and a little later to Boston, where he continued the study and practice of his art, mostly in portrait painting. He took up his residence in Philadelphia in 1846, visited Europe in 1850, returned to Cincinnati, and since 1853 has resided in Florence. His first volume of poems was published at Boston in 1847, and was followed by a collection of "Lays and Ballads" (Philadelphia, 1848). In the same year he edited a collection of "Specimens of the Female Poets of America," and in 1853 published an illustrated collection of his poems. His first long poem, "The New Pastoral," was published in 1855, and "The House by the Sea" in 1856. A new edition of his poetical works in a collected form was published in 1860 (2 vols., Boston). Of his pictures, the "Lost Pleiad" and the "Water Sprite" are perhaps best known.

READE, Charles, an English novelist. He was educated at Magdalen college, Oxford, and first became a popular favorite by his novel of "Peg Woffington," which immediately brought him into notice. Following up this success, he has produced a number of works of fiction, among which are "Christie Johnstone;" "White Lies" (1855); "Never Too Late to Mend" (3 vols., 1856); "A Good Fight and other Tales;" and "Love me Little, Love me Long." His last work is entitled "The Eighth Commandment" (1860), and is an attack on the English system of dramatic copyright. Mr. Reade has dramatized several of his novels, and is a frequent writer for the stage and for magazines.

READING, the capital of Berks co., Penn., on the left bank of the Schuylkill, and on the Philadelphia, Reading, and Pottsville railroad, 58 m. N. W. from Philadelphia, and 52 m. E. from Harrisburg; pop. in 1860, 23,165. It is very pleasantly situated on an elevated and ascending plain, backed on the E. by Penn's Mount, and on the S. by the Neversink mountain, from both of which flow streams of pure water, with which the city is abundantly supplied. It is regularly laid out, well built, and kept neat and cleanly. The streets cross each other at right angles, and in the centre is a square. The court house is a very handsome edifice, with a fine portico, and there are several other public offices. Reading contains also a gaol, 2 banks, 8 public libraries, a number of newspapers, 2 market houses, and about 20 churches, of which the German Lutheran and the German Reformed are the most conspicuous. There are various manufactories, including 3 anthracite blast furnaces, one of which is first class in style and capacity, 2 large rolling mills, 4 founderies, a nail factory, cotton factory, woollen mill, steam saw mill, and 2 flour mills. It has an active trade by means both of the railroad and of the Schuylkill and the union canals, the first of which gives it communication with the coal regions to the N., the other with the rich agricultural districts to the W.

READING, the county town of Berkshire, England, situated on the river Kennet, near its junction with the Thames, 36 m. by railroad W. by S. from London; pop. in 1851, 21,456. Silk, velvets, iron, &c., are manufactured. Reading returns two members to parliament.

REALGAR. See Arsenic, vol. ii. p. 165.

REALISM. See Nominalism.

REALTY (Lat. *res*, a thing), in law, rights or property in lands, tenements, and hereditaments. The common law of real property is distinctively and almost entirely English, being founded on the rules and customs which in the feudal period governed the tenure of lands. It is the theory of the English law, that no occupant of lands, not even a freeholder, has absolute ownership of them. He has only an estate. The king is lord paramount, and all the land in the realm is holden mediately or immediately of him. The chief estates in lands of the present time originated no doubt in the various forms of feudal tenure. Life feuds were probably earlier than feuds of inheritance; for as feuds were granted in consideration of a return of military services, and as this consideration was to be furnished by a certain individual whose already known valor or fidelity induced the gift, lands were without doubt primarily limited to the first donee; that is to say, they could neither be aliened by him to a stranger nor transmitted to his heirs. As the lords however became strong in their possessions, or when the times were more secure, it became safe and possible to grant estates of inheritance in feuds; namely, to the first taker and certain of his heirs or to his heirs in general. From these modes of tenure came the modern estates respectively, for life, in tail, and in fee. Each of these is a freehold and a real interest, but no estate less than one for life (and a lease to A for 1,000 years is, in the contemplation of the law, a smaller interest than a grant for the term of his life) is a freehold or an estate in realty. But beside lands, things real, as the tautological phrase of the law is, comprise also tenements and hereditaments; and these are embraced in this term, because they possess some of the characteristic qualities of lands, as they may be holden on tenure or are inheritable. These terms may include things incorporate. Land includes only tangible or corporeal property. It applies not only to the ground or soil, but to every thing which is attached to it naturally, as trees, stones, or herbage, or by art, as houses or other structures. Growing timber, therefore, and standing grass or grain, so long as they are rooted in and supported by the soil, are parts of the realty, though they become personalty immediately on severance. Yet contracts for the sale of things annexed like timber to the land, in prospect of their immediate separation, or for the sale of fruits of the earth already ripe, but not yet gathered, are not contracts for any interest in land, and so are not within that clause of the statute of frauds which requires that a contract for the sale of an interest in lands should be in writing. (See FRAUDS, STATUTE OF.) The criterion of realty or personalty in these cases is, whether the things sold are dependent for any part of their value on the land, or whether, in other words, the growing surface is to contribute any thing to their value before the things are severed. And it is well established that corn or any other annual product of the soil, if ripe and fit to be gathered, is personal property, and may be attached, as such, while standing in the field, and sold on execution. A permanent building erected on one's land becomes his property, even though the materials for it were wrongfully taken from another. But a building erected on another's land, by his permission, may remain the personal property of the builder. So temporary structures like bathing and fish houses, as they are not substantially fixed to the soil, may be personal property.—Things which have been incorporated with or firmly fixed to the realty, and cannot be removed without injury to it, or even those things which, though not so firmly fixed, have yet been attached and so adapted to the building or land as to be essential to its value and use, regarding the purposes for which it is employed, also become a part of the realty. (See FIXTURE.) —Beside the incidents and elements of land which we have already mentioned, and which are examples of corporeal hereditament, there may be also incorporeal hereditaments, that is, rights annexed to and issuing out of lands, as rights of common and of way, easements, and rents. These rank next in dignity and extent to lands. Rights of common are not much known in the United States. They are rights which one has in the lands of another to pasture his cattle, to take fuel for the use of his family, or timber for repairing his implements of husbandry. A right of way is the right of passage over another man's ground. It may be founded in an actual grant by the owner of the soil, or may be claimed by prescription, which supposes a grant, or it may arise immediately from necessity; as where one sells a lot surrounded by other land of his, here, as a right of passage is necessary to the enjoyment of the lot granted, the grantor is conclusively presumed to have granted it to the purchaser. If the way thus granted and ordinarily used become impassable, it seems just that the purchaser shall have the right, founded on the same presumption, of passing over the adjacent lands of the grantor. Not so, however, if the way be a private one, lying in actual grant, for here the grantor presumptively bound himself to repair. The right of the public in the highway is, ordinarily, only an easement. The fee in the soil belongs to the abuttors, and the complete use of the ground returns to them whenever it becomes discharged of the easement. The road bed of railways is generally subject to the same rules. The right of soil in land bounded by navigable rivers where the tide ebbs and flows, belongs to the owner of the land as far as low water mark. The right to navigate such waters belongs, in all states of the tide, to the public. Grants upon streams above the flow of the tide convey not only the banks but the beds of the streams and the islands in them to the middle line of the water, or *ad filum medium aquæ*. But the right of the grantee is qualified by the right of the public to use the stream as a highway if it be navigable.—An easement is well defined to be a liberty, privilege, or advantage in land, without profit, existing distinct from an ownership of the soil. It is a real interest, is within the statute of frauds, and so can be created only by deed. It differs materially in these and the like respects from license. (See LICENSE.) Among the more *common* forms of easement may be mentioned that *of support*, where the owner of a house allows his neighbor to rest timbers on the walls of his house; the easement of drip, by which one is bound to allow water to fall from his neighbor's house upon his land; rights of way or of drainage which give to their owners, respectively, the privilege of passage or of conducting water over the estate of another. Important rights are those which vest, in respect to running streams, in the proprietors of lands abutting thereon. Every owner of such lands is entitled to the use of the water as it usually flows. His neighbor higher up the stream cannot unduly obstruct the water, nor direct it altogether from its usual channel. He is bound, for the benefit of all proprietors below him, so to use the stream that its natural flow shall be unobstructed, and the enjoyment of it be undiminished.—An exclusive and uninterrupted enjoyment of any easement, in any particular way, for 20 years, or for any less period which by positive statute makes the period of limitation, founds an adverse interest sufficient to raise a presumption of title. Rent is a yearly return out of the profits or value of land in consideration of its use. (See LEASE.)

REAPING MACHINES. See MOWING AND REAPING MACHINES.

RÉAUMUR, RENÉ ANTOINE FERCHAULT DE, a French natural philosopher, born in Rochelle in 1683, died Oct. 18, 1757. He was educated at the Jesuit college in his native town, and studied law at Bourges; but repairing to Paris in 1703, he gained distinction by his philosophical researches, and in 1708 was admitted to the academy of sciences. He contributed in establishing in France or improving various manufactures, and in his treatise, *L'art de convertir le fer forgé en acier, et l'art d'adoucir le fer fondu* (1722), first made known the process of manufacturing steel. He received for his discovery a pension of 12,000 livres, which he applied to the encouragement of that branch of industry. He invented a process for tinning iron, and made experiments with less success in the manufacture of porcelain; an opaque white glass which he made is known as "Réaumur's porcelain." He also discovered the means of preserving eggs, and was the first in France to make successful experiments in artificial incubation. In 1731 he invented the thermometer which is called after him, and is still used in France; taking as the extremes the freezing and boiling points of water, and the former being zero, he divided the interval into 80 equal parts or degrees. He investigated many curious topics in natural history, especially the mode of formation and growth of the scales of fishes, the development of the shells of testaceous animals, and the reproduction of the claws of lobsters and crabs. He ascertained the nature of the singular substance that gives brilliancy to the scales of fishes, and discovered a species of mollusk that furnishes a purple dye nearly equal to that used by the ancients. His most thorough investigations were in the department of entomology, to which he devoted several years. He left *Mémoires pour servir à l'histoire naturelle des insectes* (6 vols. 4to., 1734–'42), besides a variety of papers in the transactions of the academy of sciences.

REBECK, an Arabic word signifying an instrument of the violin kind, which originally had but two strings and was played with a bow. It was introduced by the Arabs into Spain, where a third string was added, and was a favorite at rural festivals. Milton speaks of the "jocund rebeck."

REBOLLEDO, BERNARDINO, count of, a Spanish soldier and author, born in León, 1597, died in 1676. He was of noble family, and at the age of 14 embraced the profession of arms, serving in Italy and against the Turks and the powers of Barbary. He afterward took part in the 30 years' war, was created by Ferdinand II. a count of the Germanic empire, and received the government of the Lower Palatinate. In 1647 he was made by Philip IV. ambassador to the court of Denmark, and from 1662 till his death was minister of state at Madrid. He wrote *Selvas militares y politicas*, poems on the arts of war and civil government (Copenhagen, 1652); *Ocios* ("Leisure Hours," 16mo., Antwerp, 1660); *La constancia victoriosa y Trinos de Jeremias* (4to., Copenhagen, 1665), a paraphrase of the book of Job and the Lamentations of Jeremiah; and *Selvas Dánicas* (4to., 1665), a compendium of the history and geography of Denmark. The best edition of his works is that of Madrid (3 vols. 8vo., 1778).

REBOUL, JEAN, a French poet, born in Nîmes, Jan. 23, 1796. He was the son of a locksmith, and to support his mother, who had been left a widow with 4 young children, established himself as a baker. He composed songs circulated among his friends, but was totally unknown to the public until 1828, when a few lines of his, entitled *L'ange et l'enfant*, addressed to a mother upon the death of her child, appeared in the *Quotidienne* newspaper. In 1836, under the title of *Poésies*, he printed a small volume of poems which was received with great favor, and in 1840 a biblical poem, *Le dernier jour*. He has written a few tragedies, one of which, *Le martyre de Vivia*, was performed in 1850 without particular success. In 1857 he published a new volume of poems, *Les traditionnelles*. In 1848 he was elected to the constituent assembly by the department of Gard, but gained no political distinction.

RÉCAMIER, JEANNE FRANÇOISE JULIE ADELAÏDE, a celebrated French woman, born in Lyons, Dec. 3, 1777, died in Paris, May 11, 1849. She was the daughter of a post office contractor named Bernard, and in April, 1793, married a rich banker of Paris many years older than herself, and by the brilliancy of her conversation and the charm of her person and her manners made his residence a great place of resort for men of education and genius. Under the rule of the directory and during the consulate and empire her house was constantly frequented by distinguished personages, among whom were Lucien Bonaparte, Moreau, Bernane, La Harpe, Benjamin Constant, and Ba- l.; but as the society there took on a form of position to the government, she was obliged Napoleon to leave Paris. She resided for me time in Lyons, then went to Italy, and did reënter France until after the fall of Na- leon, when she returned to Paris and re- ened her saloons. In consequence of a re- rse of fortune, she retired in 1819 to the bbaye-aux-Bois near Paris, but her house nev- theless continued to be the resort of eminent en, among whom was Châteaubriand, who as her devoted admirer. Through her con- ction with that literary circle which regard- Mme. de Staël as its chief, she exercised, though herself producing nothing, a consid- able influence upon French literature. Mme. écamier was considered one of the most beau- ful women of her day. *Souvenirs et correspon- ance tirés des papiers de Mme. Récamier* have en published (2 vols. 8vo., Paris, 1860).

RECIFE. See PERNAMBUCO.

RECITATIVE (Lat. *recito*, to recite), called the Italians *musica parlante*, speaking music, species of artificial declamation adapted to usical notes, and forming a medium between dinary recitation or speaking, which it nearly sembles, and measured air or song. It was st introduced at Rome by Emilio del Cava- ere in 1600, and is now a recognized and in- ed an essential form of vocal composition in e grand Italian opera, oratorios, and canta- s, serving to express some action or pas- on, to relate a story, or to connect scenes and uations, without injuring the effect of the rformance by resorting to spoken words. lthough written in common time, the recita- ve may be delivered by the singer according his fancy, subject of course to the laws of osody, the lengths of the notes as given by e composer being mere approximations. The companiment generally consists of a few oc- sional chords struck by the pianoforte to in- cate the harmony, although sometimes the olonecellos take the chords in *arpeggio*. hen the recitative is interrupted by inter- ated passages performed by the orchestra, is said to be *obbligato*.

RECKE, ELISABETH CHARLOTTE CONSTANTIA n DER, a German authoress, born in Courland, ay 20, 1754, died in Dresden, April 13, 1833. he was the daughter of the count of Medem, nd in 1771 contracted a marriage with Von er Recke, which turned out unhappily, and 7 ears afterward separated from him. This cir- mstance, along with the death of her daugh- er in 1777, and of her brother in 1778, gave to er religious feelings, naturally strong, a mys- cal direction. When Cagliostro came to Mitau Courland, where she was then residing, she ave implicit belief to his claim of the pos- bility of holding communion with the spirits f the dead. In 1784, on a journey to Carls- ad, she became acquainted with Spalding, aller, Zöllner, Nicolai, Bürger, the brothers tolberg, and others, and through association with them was freed from some of her mystical ideas. Upon this she wrote "The Unmasked Cagliostro" (Berlin, 1787), which was translated into Russian by order of the empress Catharine, on whose invitation she visited St. Petersburg in 1795. She left various works, principally religious. Her *Reise nach Italien* (4 vols., Berlin, 1815 *et seq.*) is the description of a journey to that country made in 1804 in company with her friend Tiedge, who afterward wrote her life.

RECOGNIZANCE (law Fr. *reconisaunce*; law Lat. *recognitio*), an obligation of record entered into before a *court of record* or magistrate duly authorized to take it, with condition to perform some specified act; as to appear at the assizes or criminal court, to keep the peace, to pay a debt, or some other thing of a like description, upon the performance of which condition the obligation is to become null and void. The state or person in whose favor or to whom the recognizance is made is called the cognizee, and the person who enters into it the cognizor. The word *recognizance* is given to this kind of obligation, because, generally, the form of it is this: the clerk or other proper officer says to the cognizor: "You acknowledge yourself bound to," &c.; to which the cognizor assents; and it is then made matter of record.—Recognizances are of several kinds and descriptions, and are used for various purposes both civil and criminal. Of the former kind was a recognizance of debt at common law, in the nature of a deed to charge or incumber lands. This was very similar in form and effect to an ordinary bond, the main distinction being that while a bond is the creation of a fresh debt or obligation, a recognizance was the acknowledgment of a debt already existing upon record. It was certified to or taken by the officer of some court, and witnessed only by the record of such court, instead of having the cognizor's seal affixed to it. It was not strictly a deed, though in effect it was of greater force and obligation, and was allowed a priority of payment, and bound the lands of the cognizor from the time of its enrolment on record. It operated as a lien upon all the lands which the cognizor possessed at the time he acknowledged it, and also upon all those which he afterward acquired, so that no alienation of them made by him while his recognizance remained in force would defeat the claim of the cognizee or prevent his extending such lands. Recognizances for debt may still be taken in this country under statutory provisions, but they operate merely as evidences of debt in the nature of a judgment, upon which execution may issue, and do not generally create a lien upon the cognizor's land or other property.—There were also, at common law, two other recognizances of a private sort, said to be in the nature of a statute staple and a statute merchant. The undertaking of special bail in a civil action, of which the bail piece (a slip of parchment so called, on which it was transmitted to court) was a memorandum, was a recognizance entered into by the cognizors before the court or judge for a sum equal (or in some cases double) to that which the plaintiff had sworn to, by which they undertook that if the defendant was condemned in the action he should pay the costs and condemnation, or render himself a prisoner, or that they would pay it for him.—In criminal practice recognizances are used both as a means of securing the proper administration of justice by compelling the appearance of a party accused before a magistrate for further examination, or for trial at some superior court, and of securing the attendance of witnesses by binding them, with sufficient sureties, to appear and testify. They are used also as a means of preventing the commission of crimes, by obliging the persons suspected of an intent to commit them to recognize in some penal sum, with pledges or sureties, to keep the peace and be of good behavior for a certain time. A recognizance to keep the peace may be taken by any justice of the peace, from any one who creates an affray or disturbance in his presence, or goes about with unusual attendance or weapons to the terror of the people, or is brought before him by a constable for a breach of the peace; and he is bound to grant it in favor of any person who can show just cause to believe that he is in danger of bodily harm at the hands of another. A recognizance for this purpose is an obligation in the nature of a bond with one or more sureties, entered of record, with condition that if its requirements are fulfilled, and the cognizor keeps the peace for the time therein specified, it shall be void and of no effect. If on the contrary it is broken by any breach of the peace, it becomes forfeited or an absolute debt, and the cognizor and his sureties may be sued for the sums in which they are respectively bound. If it is a special recognizance, as to keep the peace toward any particular person, it may be forfeited by any actual violence, or even an assault or menace, to such person and to such person only. If it is a general recognizance, it is forfeited by any act which tends to break the peace, done to any person or thing in general.—A recognizance may be discharged by the death of the principal party bound thereby (if not before forfeited), or by the order of the court to which it is certified by the justice, if they see sufficient cause, and in England by the death of the king to whom it is made. If granted upon private account, it may be discharged if the person at whose request it was granted will consent to release it, or does not make his appearance to pray that it may be continued.—At the common law a peer or peeress could not be bound to recognize in any other place than the courts of king's bench or chancery; but a justice of the peace had power to require sureties from any person, not a lunatic and under the degree of nobility, whether such person were a fellow justice or other magistrate or merely a private man. Wives may demand it against their husbands, and husbands, if necessary, against their wives; but married women and infants should find security by their friends and not be bound themselves, because they are incapable of engaging themselves to answer any debt. The statutes of Massachusetts make a recognizance to appear as a witness, to the amount of $[illegible] binding upon married women and infants notwithstanding the disability of coverture or minority.—In old practice the verdict of an assize, or strictly the act of the jury in hearing and inquiring into the case in order to the making up of their verdict, was called a recognizance.

RECOLLECTS. See FRANCISCANS.

RECORD (Lat. *recordari*, Fr. *recorder*, to remember), an official contemporaneous memorandum in writing, drawn up by the proper officer of a court of justice, and containing a summary statement of the proceedings in an action at law brought before that court. This statement comprises a short history of the case and the proceedings consequent thereon; as the nature of the action, the names of the parties and the time of their appearance in court, and the acts of the court itself during the progress of the pleadings, arranged in the order of their occurrence, and sometimes connected together by entries of a peculiar nature called continuances, the whole concluding with the judgment of the court with respect to the question at issue. These continuances were adjournments of the case from one day or term to another, which the law allowed for certain purposes, and which were entered with the pleadings and other proceedings on the roll or record, and gave the whole a complete and connected form. These records were always written upon rolls of parchment, which indeed was an essential characteristic of a record. In the United States paper is universally used as a substitute for parchment, and the roll form has consequently been abolished, but otherwise the forms of the English records have been generally adopted. Records in this technical sense are peculiar to the common law; and as they form the only strict and proper proof of the proceedings of the courts in which they are preserved, they are regarded with particular consideration, and are generally a proof of such a high and absolute nature as to admit of no contradiction. In Sir Edward Coke's words, they "import in themselves such uncontrollable credit and verity, as they admit of no averment, plea or proof to the contrary." The existence of a record can only be tried by itself; that is, if in any action the existence of any matter on record is alleged, and the adverse party pleads *nul tiel record*, or that there is no such record, the issue arising thereon is determined merely by the inspection of the record itself by the court, without witnesses or jury, because no issue can be joined upon it to be tried by a jury as upon matters of fact; and the record is conclusive proof without further evidence. The peculiar privilege of some courts to have these memorials has of itself created the great leading distinction, equally recognized in English and American law, between courts of record and courts not of record. Though courts not of record may keep minutes or memorials of their proceedings, such minutes are not properly records. Legally, the term records applies to the rolls of such only as are courts of record, and not to the rolls of inferior or any other courts which proceed not *secundum legem et consuetudinem Angliæ*, or according to the laws and customs of England. During that term of the court in which any judicial act is to be done, or before the case pending is concluded, the record is said to remain in the breast of the judges of the court, and in their remembrance, and therefore it may be altered during that term, in such manner as the judges shall direct. But as soon as that term is ended, the record is closed, and admits of no change, alteration, or proof to the contrary.—The practice of recording is said to be of Norman origin. It existed in the French law, generally, as early as the time of the conquest, if not earlier, and in the same form as that which it bore in Normandy. In the *Assises de Jérusalem*, which was a code of feudal jurisprudence compiled as early as 1099, and intended for the kingdom of Jerusalem then newly established, litigants were directed to collect as many of their own friends as possible in court, and request them to attend to what was said, so that they might retain and record it properly at the time of judgment or trial. They were further directed, if there should be an adjournment or further day appointed for the hearing, that both plaintiff and defendant should put down in writing the nature of the claim and other particulars, in order that they might testify to them at the adjourned meeting if necessary, and thereby assist or confirm the recollection of the judges. This practice finally became developed, from the mere private memoranda of the pleaders, into an official contemporaneous minute of the proceedings. "Whether this change," says Mr. Stephens, "had fully taken place at the date of Glanvil's treatise (in the reign of Henry II.), that work does not enable us accurately to decide. However, we find, at least very shortly after that period, the practice of recording, in the present sense of the term, was in full operation." Next to Domesday Book, which, though not a legislative record, has all the validity of one, is the "Exchequer Register" (Pipe Roll) of 31 Henry I. The series of legal records in the court of king's bench, now extant, reach from the reign of Richard I. to the present day, and were edited by Sir Harris Nicolas (*Rotuli Curiæ Regis*, 2 vols. 8vo.) for the record commission. The peculiar construction of the record, showing as it did every proceeding in the action precisely as it took place, gave it at a very early period the highest authority as a judicial memorial; and its importance in this particular led to a suitable degree of care in framing and preserving it. Its language gradually reached the highest degree of precision and uniformity, and the whole instrument settled at last into a fixed form of expression, which neither admitted of nor required any variation. When written pleadings took the place of oral, they were framed in the same manner as they had previously appeared on the record, and were in fact simply extracts from it, the same concise and technical forms of expression being always used. From this arose a leading principle of practice, viz., that every proceeding in an action intended or required to appear on the record, must be framed in the language of the record, and with the same exactness as the record itself. Two other circumstances united to give the record the unchangeable character which has accompanied it down to modern times, and almost to the present day. One was, that it was kept in Latin, a language which admitted of no variation; and the other was its inviolable character, which preserved it from the slightest alteration after being once made up. The substitution of the English for the Latin language, and of ordinary writing for the "ancient and immutable court hand," took place in the reign of George II., and was considered by competent judges of that time as a dangerous innovation. It has been certainly followed by other important alterations and modifications, which have greatly impaired its original character as a complete and immutable memorial of all the proceedings in an action. The old continuances and the formal commencements and conclusions of the pleadings are now omitted, the language of the pleadings themselves is greatly modified, and the present tendency undoubtedly is to deprive the record in a great measure of the high dignity and importance which it anciently possessed.—Recording, as the title, or rather evidence of title to real estate, by the record or register of title deeds, is of American origin. The usage has prevailed from the early settlement of New England, and is now universal throughout the United States. By the laws of Massachusetts in 1641 all deeds of conveyance, whether absolute or conditional, were required to be recorded, that "neither creditors might be defrauded nor courts troubled with vexatious suits and endless contentions." The statutes of the various states differ in some immaterial respects as to the time and manner of registry, and as to what deeds or instruments must be recorded; but the principle in all is the same, and all make such record absolutely necessary in order to complete the purchaser's title, and render it valid against creditors and subsequent *bona fide* purchasers. If the deed is not recorded, the sale is nevertheless good and the title passes as between the immediate parties and their heirs and devisees, but it is void as against subsequent *bona fide* purchasers and mortgagees whose deeds are first recorded. In some of the states a specified time is allowed in which the deed may be recorded, as one year in Delaware, Georgia, Indiana, and Tennessee, and shorter periods in other states; and in yet others where no time is fixed by statute a reasonable time is allowed, and the deed when recorded within such reasonable time has relation back to the time of its execution, and takes effect according to priority of execution and not according to priority of registry. In 1830 the real property commissioners in England recommended the establishment in that country of a general registry of deeds and instruments relating to land, as contributing to the security of title and the cheapness and facility of transfers of land, and supported their recommendation by referring to the successful operation of the system in the United States and elsewhere. But it has as yet been adopted to a limited extent in England, and its application is restrained to special localities. Freehold but not leasehold property is recorded in Scotland in a public register, and the deed must be recorded within 60 days to render it valid against creditors and purchasers.—It has sometimes been a question whether notice of the transfer of property to a subsequent purchaser was equivalent to a record of the prior deed, and whether the deed of a subsequent purchaser with such notice, duly recorded, would be valid against the prior unrecorded conveyance. The record of a title deed is not considered as conferring title in itself, but merely as evidence of notice or as constructive notice to the public of the title passed by the deed of conveyance of which it is an official and certified copy; and it is therefore a general rule that notice, actual or implied, to a subsequent purchaser of a prior conveyance, is as effectual to defeat his claim as a *bona fide* purchaser as a due record of such conveyance would be; for so long as he receives notice of the prior incumbrance, it makes no difference whether such notice is derived from a record, or from any other authentic source, and he purchases thereafter at his peril. In other words, if he knows that the land he buys has already been conveyed to another person who has neglected to record the deed, he cannot claim the rights of a *bona fide* purchaser.

RECORDE, Robert, an English physician and mathematician, born in Tenby, Pembrokeshire, about 1500, died in 1558. He entered Oxford university in 1525, was elected a fellow of All Souls' college in 1531, and taught rhetoric, mathematics, music, and anatomy. In the latter part of his life he resided in London, and was physician to Edward VI. and to Queen Mary. He wrote the "Gate of Knowledge," and the "Treasury of Knowledge," both of which are lost. His extant works are: "The Urinal of Physic;" "The Castle of Knowledge;" "The Whetstone of Wit," a mathematical work; "The Ground of Arts, teaching the Work and Practice of Arithmetic;" and "The Pathway to Knowledge," a compendium of geometry.

RECORDER, an old-fashioned instrument resembling the flute, with which it has sometimes been confounded, but more akin to the flageolet. Its tone was soft and piercing; whence Milton speaks of "flutes and soft recorders."

RECTOR (Lat. *rego*, to rule), literally, a ruler or governor. The term is used: 1, in the church of England, to designate the clergyman who possesses the tithes of a parish, and who is properly a parson; 2, as the title of the chief elective officer in a college, or of the head of a high school; 3, by the Jesuits for the superiors of their seminaries or colleges.

RECTORY, the office of rector; and, comprehended as a whole, a parish church with its rights, tithes, &c. The name is also given to the residence of a rector.

RECUSANT (Lat. *recuso*, to refuse), a term of frequent occurrence in English ecclesiastical history, and used to designate those persons in general, who refused or neglected to attend divine service on Sundays or holidays in the established church, or to worship God according to its forms. The use of the word in temporal courts is traced to the first year of Queen Elizabeth, when it was enacted that all persons who, without reasonable excuse, failed to attend some usual place of prayer, should be censured and fined for every omission 12 pence. In 23 Elizabeth the fine or forfeiture was raised for every month 20 pounds; and in 35 Elizabeth it was enacted that if recusants failed to submit within 3 months after conviction, they might, upon the requisition of 4 justices of the peace, be compelled to abjure and renounce the realm; and if they did not depart, or if they returned without license of the crown, they were guilty of felony and should suffer death without benefit of clergy. In the case of recusants who professed the Roman Catholic religion, and who were designated popish recusants, the laws were more severe; in addition to the above general penalties, they were disabled from taking lands, either by descent or purchase, after the age of 18, until they renounced their errors, and were incapacitated for several minor rights of the subject. "Popish recusants convict," as they were called, after having been once convicted, were virtually outlaws. Protestant dissenters were relieved from the penalties of recusancy at the revolution by the toleration act; and in 1829, by the Catholic relief act, Popish recusants were exempted from prosecution; but the statutes against recusancy still exist, though they are but seldom enforced, against persons who absent themselves from church, being neither Roman Catholics nor Protestant dissenters.

RED, the most brilliant of the colors of the solar spectrum, seen in nature in the arterial blood, which is of a medium hue between crimsons that partake of blue, and orange—the color of flame, that borders on yellow. Beside these shades of red a number of others are recognized, as scarlet, vermilion, and Indian red; the first of a brilliant hue lighter than crimson, the second a very bright red, and the ed of a dark shade. The color often results from slight modifications of the manner in which the light is reflected from the surface of bodies, as in the colors of fruits, flowers, insects, &c., the hue changing with the movement of these bodies. So, too, apparently insignificant modifications in the chemical composition of bodies, as a slight accession or diminution of oxygen, determines a red, blue, brown, yellow, or black color. In nature brilliant reds are seen in the plumage of birds of tropical climes, and in insects and fishes. Infusions of the cochineal insect furnish the rich carmine; and from those of the safflower are prepared the beautiful vegetable rouge. (See Carthamus, and Rouge.) Many ripe fruits and berries display rich red colors; and in the mineral kingdom they are seen in the highest perfection in the ruby and in the peroxides of iron or ochres, which with red lead or minium (see Lead, vol. x. p. 289) furnish the materials for the common red paints. The red oxides of copper and of silver, cinnabar (sulphuret of mercury), the chromate of lead, and a variety of other metallic ores and minerals, display beautiful red colors. In the depths of the sea the corals and shells of the mollusca assume brilliant shades of red; and some of the crustaceans, as the lobster, become red on being boiled in water. The peculiar qualities of the color are referred to in the article Color; and some special preparations of it in the articles Carmine, Cochineal, Rouge, &c.

RED BIRD. See Grosbeak.

RED JACKET, a North American Indian, chief of the Senecas, an Iroquois tribe, born about 1759, died near Buffalo, N. Y., Jan. 20, 1830. His Indian name was Sagoyewatha or Saguwatha (the keeper awake). His English name was due to a richly embroidered scarlet jacket given him by the British during the revolution, which he constantly wore. He won distinction in his tribe as an orator, and boasted that he "was born an orator." There is reason to believe that he was among those Senecas who during the revolution distinguished themselves by their ravages on the frontiers of New York, Pennsylvania, and New Jersey. At a council held at Fort Stanwix, in 1784, to negotiate a treaty between the United States and some of the Six Nations, for the cession of lands, he spoke very eloquently against the treaty. It was nevertheless ratified; but Cornplanter, who was then chief of the Senecas, and advocated it, lost his popularity in consequence, and was ultimately supplanted by Red Jacket. A few years later, Red Jacket had an interview with Gen. Washington, who gave him a silver medal which he wore ever afterward. In 1810 he gave information to the Indian agent of the attempt made by Tecumseh to draw the Senecas into the western combination; and in the war with England of 1812 he offered the service of his tribe to the United States. They took part in several skirmishes, and the courage of Red Jacket was particularly conspicuous in an action near Lake George on Aug. 19, 1812. He always strenuously resisted the advances of civilization, but gradually became in his later years a confirmed drunkard.

RED LEAD. See Lead, vol. x. p. 289.

RED RIVER, a tributary of the Mississippi, and the last of considerable size which it receives. It is formed by the confluence of two principal branches, of which the southern and larger rises in New Mexico, a little beyond the W. boundary of Texas, lat. 34° 42' N., long. 100° 7' 10" W.; the northern in Texas, lat. 35° 35' 3" N., long. 101° 55' W. After the junction, near lat. 34° 30' N., long. 100° W., it flows nearly E., separating the Indian territory from Texas; a little beyond the extremity of the latter, at Fulton, Ark., it bends to the S. and enters Louisiana; thence flowing S. E., it enters the Mississippi 341 m. from its mouth. Capt. Marcy, by whom the river was explored, estimates its entire length, including the south fork, at 2,100 m., of which the main stream is 1,200 m. He states that the main or southern branch has its sources in the fissures of an elevated and barren plain, the Llano Estacado, at an altitude of 2,450 feet above the sea. For about 60 m. the banks rise perpendicularly from 500 to 800 feet. After leaving the Llano Estacado it flows for 500 m. over a broad bed of light shifting sands through an arid prairie country. It then enters a most fertile country, covered by gigantic trees. "Here the borders contract, and the water for a great portion of the year washes both banks, carrying the loose alluvium from one side and depositing it on the other, in such a manner as to produce constant changes in the channel, and to render navigation difficult. This character continues throughout the remainder of its course to the delta of the Mississippi; and in this section it is subject to heavy inundations, which often flood the bottoms to such a degree as to destroy the crops, and occasionally, on subsiding, leaving a deposit of white sand, rendering the soil barren and worthless." The principal tributaries are the Big and Little Washita, from the N. It is navigable for 8 months of the year to Shreveport in the N. W. of Louisiana, and continually to Alexandria, about half the distance. The Great Raft, a very serious obstruction to the navigation of the river, consists of an immense collection of trees and drift wood, which commences about 30 m. above Shreveport and extends 60 or 70 m. up the river, spreading out to a width of from 20 to 30 m., and dividing the main body of the river into a great many channels, which are not all united until near Natchitoches, a distance of nearly 100 m. After a short distance a large portion of the waters is again diverted, supplying a great number of lakes, channels, and bayous along its banks. The raft was partially removed by the U. S. government in 1834-'5, at an expense of $300,000, but another has since been formed, interrupting navigation about as much as its predecessor.

RED RIVER, a N. E. co. of Texas, separated from the Indian territory by Red river, and bounded S. by Sulphur river, one of its branches; area, about 1,200 sq. m.; pop. in 1860, 8,534, of whom 3,039 were slaves. It has an undulating surface and fertile soil. The productions in 1850 were 95,510 bushels of Indian corn, 16,090 of oats, 7,338 of sweet potatoes, and 579 bales of cotton. There were 2 churches, and 257 pupils attending public schools. Capital, Clarksville.

RED RIVER of the North, a river which has its source in a collection of small lakes lying in central Minnesota, the largest being Otter Tail lake. The main stream flows for about 50 m. S. W., then makes a turn to the N. W., receives the Bois des Sioux, and inclining more nearly N., passes through Minnesota into the Hudson's Bay territory, falling into Lake Winnipeg after a course of about 500 m. A great number of streams from the lakes abounding near its source contribute to its waters, and throughout its whole length its tributaries succeed each other at short intervals. The largest of these are the Shayuen, Buffalo, Manomin or Wild Rice, Red Lake river, and Pembina.

RED SEA, anciently known as the Arabian gulf, a large sea lying between Africa and Asia, separating Egypt, Nubia, and Abyssinia in the former from Arabia in the latter. It extends in a straight course nearly N. N. W. and S. S. E. from lat. 12° 30′ to 30° 2′ N., having a total length according to Dr. Buist of 1,230 m., measured from the straits of Bab-el-Mandeb at the S. to Suez at its N. termination. Its greatest breadth of 192 m. is in lat. 17°, and toward each extremity the sea narrows; at lat. 14° it is 72 m. wide, and about the same in lat. 27° 20′ From this point N. the sea is divided into two narrow branches. The principal one is the western, called the gulf of Suez, and is the proper continuation of the Red sea; it is 167 m. long, and its width is usually about 20 m. The other, called the gulf of Akabah, extends about 100 m. N. by E. with a maximum width of 16 m.; at the mouth the width is 7 m. This branch occupies a deep depression between mountainous regions on each side, and beyond its N. extremity this is continued in the long narrow valley, Wady-el-Arabah, which runs toward the Dead sea. The depth of water in the gulf of Akabah for ⅔ of its length is about 700 feet, and at one spot no bottom was found at 1,200 feet. The gulf of Suez is about 125 ce t deep, and the greatest depth found is 300 dep In the Red sea a depression of 5 to 10 at 2, width is reported to occur down the 6,000 fe portion of from 1,000 to 1,500 feet in across th lat. 25° 20′ no bottom was found depth near t, and also at another spot at tween this and ear the outlet a shoal extends over 700 feet. from Mocha, the maximum hannel being 240 feet. Between straits the water deepens to nall island, called Perim, recently taken possession of by the English, lies in the mouth of the Red sea, dividing the passage into the great straits on the W. side and the little straits on the E., the former about 13 m. wide, and the latter 1¾ m.; vessels usually pass by the narrower channel. The total area of the Red sea is estimated at 108,15[illegible] sq. m., of which the gulf of Suez includes [illegible] sq. m., and the gulf of Akabah 800. No large islands are met with, but many groups of small islands and of coral reefs and islands lie near the shores, especially in the S. portion of the Red sea. To the S. of lat. 16° the islands are volcanic, and on Gibel-Teer in lat. 15° 30′ is an active volcano rising 900 feet above the sea. On both coasts of the S. portion ranges of volcanic hills extend parallel with the shore, in Africa about 14 m. distant from it. N. of lat. 16° on the African side isolated hills form a considerable part of the coast, and the mountain ranges are further in the interior. All around the Red sea mountains are everywhere in sight, and the region lying between the two gulfs at the N., known as the peninsula of Mt. Sinai, is a district of mountains and deserts. Mt. Sinai itself is midway between the gulfs, about 50 m. N. of the extremity of the peninsula. As no rivers run into the Red sea and the region has but little rain, while the evaporation from the surface of the sea is estimated to amount to a depth of 8 feet annually, it has been supposed that the water must be exceedingly salt. It is found, however, to contain only 39.2 to 41 grains of saline matter in 1,000, which is even less than that of sea water in some places; and it is therefore probable that the waters most charged with salt form an under current which flows out through the straits as the lighter and less saline upper current flows in. The waters of the sea are remarkable for their high temperature, particularly in the volcanic region between lat. 1[illegible] and 21°. Even in the winter months they seldom fall below 80°. In March and April their temperature is sometimes 84°, and in May 90°. In Nov. 1856, at a time when the air was at 82°, the water was observed to be at 10[illegible]. This explains the occurrence of coral reefs in the Red sea in more northern latitudes than they are elsewhere found. They are very numerous about a quarter of a mile off the shore, and seriously obstruct the navigation. A channel for small vessels is commonly found within the reefs, but the shores are in great part inaccessible to large vessels. Some of the huge specimens of *meandrina* and *favia* observed by Ehrenberg, of 6 to 9 feet diameter, from the rate of growth of these species are regarded as several thousand years old, and must have been growing in the time of the Pharaohs. The winds are either up or down the sea. From October to May or June they blow from the S. S. E., being strongest in February; the rest of the year they are from the N. N. W. and strongest in June and July. Light showers occasionally fall from November to March.

he tides at the head of the sea rise to the ight of 5 feet, and the spring tides to 7 feet. he winds, however, greatly affect the height f the water, as is felt especially in the shoaler arts near Suez, where the gulf is sometimes orded by the Arabs at low tide, and after the revalence of northerly winds. It was forerly supposed from the measurements of M. epère that the surface of the Red sea at high ide was about 30 feet higher than that of the editerranean near Alexandria; but the survey f Mr. Robert Stephenson, a report of which as made to parliament in 1851, shows no difrence in the elevation of the two seas. The istrict between the head of the gulf of Suez nd the gulf of Pelusium, the nearest point f the Mediterranean, is low, much of it not ore than 6 feet above the level of the seas, nd a portion of this tract is composed of kes ranging along from one sea toward the ther, all together indicating that a communiation formerly existed between the two seas. o open this communication by a ship canal has ong been regarded as most desirable, and was a avorite project of Napoleon I. In 1859 the enerprise was undertaken by a French engineer, M. F. de Lesseps, who had acquired in 1854 rom the viceroy of Egypt the exclusive right, nd up to Nov. 1858 had obtained subscriptions or carrying out the enterprise amounting to 8,000,000. The canal is to be 90 miles long, 20 feet wide at the water line, and its bottom 29 feet below low water level in the Mediteranean. The difficulties to be encountered in his work, and in constructing the harbors at ach end, are so great that the successful issue of the undertaking is still considered doubtful. The importance of such a connection ither with the Mediterranean or the Nile was appreciated even in the time of the ancient Egyptian kings; and, as stated by Humboldt: "The execution of a canal was begun, f not by Sesostris, to whom Aristotle and Strabo ascribe the undertaking, at any rate by Neku, although the work was relinquished in consequence of the threatening oracular denunciations directed against it by the priests. Herodotus saw and described a canal completed by Darius Hystaspis, one of the Achæmenidæ, which entered the Nile somewhat above Bubastes." This canal was kept in operation at the time of the Roman dominion under Marcus Aurelius, or even as late as Septimius Severus. It was by the Red sea in ancient times, before the discovery of the passage around the cape of Good Hope, that the trade between the countries on the Mediterranean and India was carried on; and upon this sea and the other inland gulfs and seas of this part of the old world the earliest commercial operations were conducted and the first experience in navigation was gained. The Egyptians and Phœnicians established this trade with India, and so important was it to the former people, that, as recorded by Herodotus and Diodorus, Sesostris had upon the Arabian gulf a fleet of 400 long vessels or ships of war, by means of which he efficiently protected it and subjugated the people on the borders of the sea that interfered with it. Two important ports, Berenice and Myos-Hormos, were established on the African side, from which communication was opened with the Nile; from the former by an admirably constructed road of 258 miles. Over this the transportation was by camels, and from Coptos by boats to Alexandria on the Mediterranean. The Phœnicians also seized from the Idumeans some important places near the N. E. extremity of the Arabian gulf, and from these sent their ships in the one direction to India and the S. coast of Africa, and in the other to the N. W. head of the gulf, whence their cargoes were transported over land to the harbor of Rhinocolura on the Mediterranean, of which they had also obtained possession, and thence by sea to their own ports. In the middle ages the Genoese and Venetians were largely engaged in this trade, until the Portuguese destroyed it by their adoption of the more economical route to India round the cape of Good Hope. The Red sea thus lost entirely its commercial importance; but this has been in part revived by the establishment by the English of what is known as the overland route to India, which is the old route by the Mediterranean and the Red sea, the only land passed over being from Cairo to Suez, a distance of 84 m., traversed by a railroad recently completed. The principal ports on the Arabian side are Jiddah, Hodeida, and Mocha. The export trade in coffee has now almost forsaken Mocha for the neighboring port of Hodeida. Massowah is the principal town on the African side, and its exports of coffee, myrrh, incense, hides, gum, ivory, senna, slaves, and gold dust are estimated to amount to the value of about $2,000,000 annually.—The Red sea is often referred to in the Old Testament, under its Hebrew name of *Yam Suf*, the sea of weeds. It was thus called, it is supposed, from the abundant plant-like growth of corals seen upon the bottom. The name Red applied to it is variously explained. It is a translation of the Latin *Rubrum* and Gr. Ἐρυθρά, which were applied to this sea in common with the Persian gulf and Indian ocean by Herodotus and other ancient writers. The original name, some suppose, was derived from that of an ancient monarch of Arabia, Erythras, and was not intended to refer to the color, which this name means; this is the explanation of Pliny, Strabo, Curtius, &c. Others suppose it is from Edom, the ancient name of the neighboring country, which in Hebrew and Phœnician means red. It is also believed that the abundance of red coral found in the sea suggested the name; and Dr. Buist and others assert that it comes from the multitudes of animalcules that in the spring cover the surface of large portions of the sea in patches sometimes several miles square, and give to the water an intensely blood-red color. The most interesting historical incident connected with the Red sea is the passage of the Israelites across its bed in their escape from Egypt, as recorded in the Old Testament; and much controversy has grown out of the question as to the point where this passage was made, some contending that it was 18 m. S. of Suez, where the sea is 12 m. wide, and others that it was in the immediate vicinity of this town, where the sea is now fordable at low tide, and its breadth is only about 3,500 feet. Here, the waters being kept down by the strong E. or N. E. wind, as described by Moses, the passage of the immense hosts may have been completed on the ebb tide, and the returning flood, which still comes in with considerable rapidity, must have overwhelmed the armies that pursued them. This appears to be the only place where the strong east winds, which from the scriptural account the Lord made the active cause of the miraculous removal of the waters, could have produced this effect, and where the passage of a great multitude could have been made in a single night.

REDBREAST. See Robin.

REDDING, Cyrus W., an English journalist and author, born in Penryn, Cornwall, in 1785. In 1805 he went to London, was engaged upon the staff of an evening newspaper called "The Pilot," and subsequently established and conducted for several years the "Plymouth Chronicle." From 1815 to 1818 he resided in France, where he edited "Galignani's Messenger." In 1820 he became editor, in conjunction with the poet Campbell, of the "New Monthly Magazine," and during 10 years remained in that position, having in his hands almost the entire executive control of the magazine. In 1830, in consequence of a quarrel between Campbell and the publisher Colburn, the former left the "New Monthly," taking with him Redding, and began the publication of the "Metropolitan," which proved unsuccessful. Subsequently he edited for two years a liberal political newspaper, called the "Bath Guardian," and in 1836 established the "Staffordshire Examiner," a journal advocating similar political views. After editing this sheet for 5 years he returned to London in 1840, and is now connected with the "Examiner." He has written much, but is most widely known by his "History of Wines" (1833).

REDEMPTION, Equity of. See Equity of Redemption.

REDEMPTORISTS, or Congregation of the Most Holy Redeemer, the name of the youngest among the great monastic orders of the Roman Catholic church. It was founded in the year 1732 by Alfonso de Liguori at Scala, in the province of Benevento, on nearly the same basis on which, about a century before, St. Vincent de Paul had established the congregation of the priests of the mission. At first the new congregation had to overcome the opposition of several priests of high position, as the archbishop of Naples; but in 1749 it was confirmed by Pope Benedict XIV., who bestowed upon its members many favors and privileges, and induced them, for fuller distinction from the canons of the Most Holy Redeemer, to adopt the name Redemptorists. After their founder they frequently were and still are called Liguorians. The rule of the Redemptorists prescribes, beside the three usual monastic vows, a fourth, which obliges the members to accept outside of the order no dignity, office, or benefice, except upon an express order of the pope or the superior general, and not to leave the order unless by special permission of the pope. The principal sphere of action of this order has been the conducting of what is called a "mission," lasting one, two, or sometimes even more weeks, during which time the missionaries endeavor to prevail upon all the members of a church to devote their time principally to religious exercises and a thorough reformation of their lives. These missions frequently attract immense crowds from the neighboring congregations. On account of their great similarity of object and action with the Jesuits, they have been sometimes confounded with the latter; the names of both orders have been often linked together, and in more than one European country the names of both stand side by side in the same decree of proscription. The order spread early from Naples into Sicily and the Papal States; but even before the death of the founder all the houses in the kingdom of Naples were excluded from the order, because they had procured the ratification by the government at the expense of important and unauthorized alterations of their rule. The division lasted until 1790, when a reunion was effected. The first German members established missions in Courland and at Warsaw, but both succumbed to the wars arising out of the French revolution. In Austria they have had since 1808 many influential patrons, and it has ever since remained one of the most important provinces of the order. In France they suffered some losses from the interference of the government in 1830, and again in 1861. They have found an important sphere of action in the United States of America, where they principally labor among the German population. A number of American members, among whom Fathers Hecker and Hewitt are best known, left the order by special permission of the pope, in order to found an independent organization for missionary purposes, better suited to this country, called the Paulists, who established their first house in the city of New York in 1858. In 1860 the Redemptorists had 30 houses in Italy, 21 in Germany, 9 in France, 9 in Belgium and Holland, 4 in the British islands, and 10 in the United States (at Annapolis, Baltimore, Buffalo, Cumberland, Detroit, New Orleans, New York, Philadelphia, Pittsburg, and Rochester). Altogether they had in these establishments about 1,300 members.—A congregation of Redemptorist nuns, which was likewise founded by Liguori in 1732, has never extended itself widely; it counted in 1860 only 1 house in

Italy, 4 in Germany, 2 in Belgium and Holland, and 1 in Third street, New York.

REDEN, Friedrich Wilhelm Otto Ludwig, baron, a German statistician, born in the principality of Lippe-Detmold, Feb. 11, 1804, died in Frankfort-on-the-Main in Nov. 1857. He was graduated as doctor in law at the university of Göttingen in 1814, and entered the public service in Hanover. In 1832 he was elected a deputy in the first chamber, assisted in framing the constitution of 1833, and in 1834 became secretary-general of the minister of finances. Upon the accession of King Ernest Augustus in 1837, and his arbitrary restoration of the constitution of 1819, Reden retired from office, travelled in various parts of Europe, and made a large collection of statistical documents. In 1841 he was made special director of the railroad from Berlin to Stettin, established himself at Berlin, and shortly after received the chair of economical and administrative sciences in the university of that city. He represented a Hanoverian district in the national assembly at Frankfort, and sat in the assembly of the states of Hanover in 1849. By his course in the latter body he incurred the displeasure of the Prussian government, and was deprived of his several positions under it. He left many works on statistical subjects.

REDFIELD, William C., an American meteorologist and geologist, born in Middletown, Conn., March 26, 1789, died in New York, Feb. 12, 1857. At the age of 14 he was apprenticed to a saddler at Upper Middletown, now Cromwell, but studied diligently by the firelight in the winter evenings. At the close of his apprenticeship, Mr. Redfield set out on foot to visit his mother in Ohio, following nearly the present course of the New York central railroad, and keeping a daily journal of his observations. Spending the winter in Ohio, he returned in the spring by a more southern route, nearly that of the Baltimore and Ohio railroad, and labored at his trade in Upper Middletown for nearly 14 years, keeping also a small country store. In Sept. 1821, a violent hurricane, long known as the "great September gale," passed over the Atlantic states. It was then universally believed that in hurricanes or wind storms the wind blew in right or straight lines. In a journey which Mr. Redfield made soon after the gale into Massachusetts, he found that the wind, which at Middletown had blown from the S. E., had, at a point less than 70 m. distant, blown from the N. W. at the same moment; and further observation convinced him that the storm, instead of taking a straight line, had rotated around a central point, and that its movement had been in curved lines. In 1821 or 1822 he had become interested in steamboat navigation, and when the public had been terrified by repeated explosions of steamboat boilers, he devised and established a line of safety barges for passengers to be towed by steamers, at such a distance as not to endanger the passengers in case of explosion. When this terror had died away, he applied the same principle to freight boats, and originated a transportation line of tow boats and barges on the Hudson, to which he gave the appropriate name of the Swiftsure line, and for the remainder of his life was actively engaged in its management, making New York his residence. He investigated thoroughly the whole subject of the connection of steam with navigation, and in pamphlets, essays, and published letters, some of them called out by government inquiries, he discussed the causes of steamboat explosions, the means of safety, the necessity of careful and frequent inspection, the improvement of the law relative to steam navigation, its adaptation to the purposes of national defence, and the simplification and improvement of marine engines. In 1829 he published a pamphlet urging the importance of a system of railways to connect the waters of the Hudson with those of the Mississippi. At the time this pamphlet was published, the Erie canal was but just completed, only a few miles of railway had been constructed in the United States, and locomotives were not yet introduced. The same year he conceived the idea of street railroads in cities, and petitioned the common council for permission to lay the track for one in Canal street, New York. He subsequently explored the route and aided in obtaining the charter of the Harlem railroad, and still later promoted the building of the Hartford and New Haven and the Hudson river railroads. In 1831 he first gave to the public, through the "American Journal of Science," his "Theory of Storms," and 2 years later his elaborate article on the hurricanes of the West Indies appeared in the same journal. These were followed by many other essays, narratives, and tables of particular hurricanes; and the corps of observers who had become interested in the subject through his earlier essays comprised many eminent scientific men, with several of whom he maintained a correspondence for years. (See Hurricane, Meteorology, and Reid, Sir William.) Subsequently to the year 1836 he devoted much time to the investigation of the fossil fish of the Connecticut valley and the sandstones of the Atlantic coast in New Jersey, Virginia, and North Carolina, and had made a very large collection of them. He prepared several papers on these fossils, which were read before the American association for the advancement of science; and in the last of these, read in 1856, and subsequently published in the "American Journal of Science," he demonstrated that the fossils of the Connecticut river valley and New Jersey sandstones, to which he gave the name of the *Newark group*, belonged to the Jurassic period. He published during his life 62 distinct essays, of which 40 pertain to meteorology.

REDHEAD. See Duck, vol. vi. p. 646.

REDING, Aloys von, a Swiss patriot, born in the canton of Schwytz in 1755, died in Feb. 1818. He first entered the Spanish service, but in 1788 returned to Switzerland. On the French invasion of 1798, he summoned the forest and mountain cantons to the succor of Bern, and at the head of the army of the canton of Schwytz, 3,000 strong, held the French army in check for 2 days at Morgarten. Overcome at last by superior numbers, they accepted the convention; and after the formation of the Helvetian republic Reding was one of those who zealously advocated the restoration of the old federal constitution. After the departure of the French almost all the cantons declared themselves against the government, and Reding called at Schwytz a general meeting, which assembled Sept. 27, 1802, and devoted itself to the formation of an independent political system. As head of the provisional government he had in 1801 gone to Paris to impress upon Bonaparte his plan of administration, but had been unsuccessful in his mission, was made prisoner by Marshal Ney, when by Bonaparte's orders that officer interfered in Swiss affairs, and imprisoned at Arbourg. In 1803 he was made *landamman* of Schwytz, then retired to private life, and in 1809 was again called to occupy his old position. In 1813 he conducted the negotiations with the Rhenish confederation, in regard to the neutrality of Switzerland.

REDOUTÉ, PIERRE JOSEPH, a French painter of flowers, born at St. Hubert, near Liége, Belgium, July 10, 1759, died in Paris, June 19, 1840. He belonged to a family of painters, and, having settled in Paris, painted some of the most elegant flowers in the series known as the *Collection des velins*, commenced under Louis XIV. and still continued under the supervision of the academy of fine arts; and in 1822 he succeeded Van Spaendonck as professor of vegetable iconography at the *jardin des plantes*. His magnificent works, *Les liliacées* (8 vols. fol., Paris, 1802–'16), and *Les roses* (3 vols. fol., 1817), are the finest known specimens of botanical illustration. A copy of the former on vellum, with the original drawings, was purchased by the empress Josephine for 84,000 francs.

REDPOLL. See LINNET.

REDSHID PASHA. See RESHID PASHA.

REDSTART, the common name of the warblers of the American genus *setophaga* (Swains.). The bill is as in other flycatchers, and abruptly curved and notched at the tip; the wings rounded, with the 2d to 4th quills longest; tail long, graduated, and broad; tarsi and toes short. There are many species, mostly in South and Central America, brilliantly marked with red, yellow, and black; the South American species have more or less yellow in their plumage, and the Mexican are usually black and red. The best known species in North America is the common redstart (*S. ruticilla*, Swains.); it is about 5¼ inches long with an alar extent of 8; in the male the prevailing color is black, with the base of the wings and tail and sides of breast reddish orange; abdomen, under tail coverts, and central line on breast white; in the female the black is replaced by olive green above and brownish white below, the head is ashy, and the red is changed to yellow. It is found throughout the eastern United States to the plains of the Missouri, and sometimes wanders to the West Indies in winter; it is a very handsome bird, always in motion on the trunks and branches of trees in search of insects and larvæ, jumping quickly from side to side, displaying the brilliant tail at every movement, and now and then darting off after an insect on the wing, or descending to the ground in a spiral or zigzag manner; it also pursues other birds as if in sport, snapping the bill violently. The nest is placed in a low bush, suspended to the twigs, and is of delicate structure; the eggs are 4 to 6, white, with ash-gray and black spots; a single brood is raised in a season.—The European redstart belongs to a different sub-family of the warblers, and to the genus *ruticilla* (Brehm), peculiar to the old world. The *R. phœnicura* (Brehm) is a little more than 5 inches long; in the male the bill, legs, feet, cheeks, and throat are black; the breast, rump, and sides red; forehead white; crown, hind neck, and back deep blue-gray. It occurs all over Europe, and is a visitor to Great Britain from April to September; unlike its American ally, it is a very fine songster, heard the summer long in orchards, hedge rows, gardens, and ivy-covered walls; the male is very affectionate, and sometimes sings to his mate as late as 10 at night and as early as 3 in the morning; it feeds on insects, worms, and berries; the eggs, 4 to 6, are greenish blue, and laid in holes of trees or in a nest on the ground. It is much prized as a cage bird for its beauty and its song; if taken young, it may be taught to imitate the notes of most other birds, and even to whistle a tune. The name in both hemispheres is derived from the constant jerking motions of the bird, displaying the red of the tail.

REDWING. See BLACKBIRD.

REDWITZ, OSCAR, baron, a German poet, born in Lichtenau, near Anspach, June 28, 1823. He spent nearly 5 years in the university of Munich in the study of philosophy and law. In the autumn of 1851 he was called to Vienna as professor of general literary history, but resigned his position in 1852 in order to devote himself to literary pursuits. His works have passed through numerous editions.

APPENDIX.

QUAKERS.* The society of Friends, commonly called Quakers, is a body of Christian professors which arose in England about the middle of the 17th century. Many of those who joined it belonged to families of high respectability, and had been distinguished for their piety. The ministry and labors of George Fox were chiefly instrumental under the divine blessing in convincing them of the Christian principles held by Friends, and his labors contributed largely to their establishment as a regularly organized body. He was born at Drayton, Leicestershire, in 1624, and educated in the Episcopal worship. From childhood he led a religious life, and being apprenticed to a shoemaker who also kept sheep, his occupation was chiefly that of a shepherd. Passing much of his time in retirement and being earnestly engaged for the salvation of his soul, he diligently read the Holy Scriptures, waiting on the Lord to be taught by his Spirit their true meaning. In this state of humble dependence, he was enlightened to see the spiritual nature of the gospel dispensation, and was favored to experience the work of redemption. Receiving a divine call to the ministry, he commenced his labors in the year 1647, and, from a conviction that it was contrary to Christ's command, refused to receive compensation for preaching. The purity of his life and the heavenly unction attending his ministry carried conviction to the hearts of the people, and multitudes embraced the principles he promulgated. Speaking of his mission, he says: "I was sent to turn people from darkness to light, that they might receive Christ Jesus; for to as many as should receive him in his light, I saw that he would give power to become the sons of God, which I had obtained by receiving Christ. I was to direct people to the spirit that gave forth the Scriptures, by which they might be led into all truth, and so up to Christ and God, as those had been who gave them forth. I saw that Christ died for all men, was a propitiation for all, and enlightened all men with his divine and saving light, and that none could be true believers but those that believed therein." In a few years meetings were settled in nearly all parts of the kingdom, and notwithstanding the persecution to which the society was subjected because of its testimony against oaths, a paid and man-made ministry, war, using false and flattering compliments, and the plural pronouns to a single person, &c., its members increased, and manifested a zeal, devotedness, and love of each other, which excited admiration even in their opposers. Numerous ministers, divinely called to and anointed for the work, travelled through Great Britain, and on the continent of Europe, where many meetings were settled, and some went to Asia and Africa. Many came to America, enduring great hardships in their journeys through the wilderness; and a large body of Friends, under the patronage of William Penn, emigrated from the mother country and settled in Pennsylvania.—When it is considered that all who regularly attended the meetings of Friends, as well as their children, were viewed as members, it is obvious that some system of church government was necessary by which their conduct might be regulated and controlled. George Fox early began the establishment of meetings for discipline, and in a few years had the satisfaction of seeing its accomplishment both in Europe and America. The first objects of attention in these meetings were the care of the poor, the maintenance and education of orphans and poor children, the orderly accomplishment of marriages, the registry of births and deaths, the granting of certificates of approval to ministers travelling abroad, and preserving an account of the sufferings of Friends in support of their religion. While it was to be expected that offences would arise, it did not necessarily follow that the erring one must be cut off; and measures were adopted for extending brotherly labor, in the spirit of love and meekness, for the restoration of such. When brought sincerely to condemn his error and amend his way, a brother is gained; and if this desirable result is not attained, the church testifies against his misconduct and declares that he is no longer a member of it. This is the extent of the censure pronounced by the society, and its proceedings are founded on the directions given by our Lord in Matt. xviii. 15–20. The disciplinary care of the society was also exercised to preserve its members from denying or impugning its Christian principles. The records of the monthly meeting held at Haverhill, England, the 9th of first month, 1676, contained a minute disowning Jeffery Bullock for contravening the doctrines of Friends by "affirming that he expects neither justification nor condemnation by that Christ that died at Jerusalem." At London yearly meeting held 1694, a rule was adopted for dealing with persons, if any such there were, professing with Friends, who "held any such gross errors or false doctrines as are against the validity of Christ's sufferings, blood, resurrection, ascension, or glory in the heavens, or any way tending to the denial of the heavenly Man, Christ." The discipline adopted at an early period by the American yearly meetings contains a rule for dealing with and disowning members who persist in "denying the divinity of our Lord and Saviour Jesus Christ, the immediate revelation of the Holy Spirit, or the authenticity of the Holy Scriptures;" and at different periods persons have been disowned for such errors. There are four grades of meetings for discipline: first, preparative, which prepare business for the second or monthly meetings, in which the executive power is chiefly lodged; then the quarterly meetings, consisting of several monthly meetings, and exercising a supervisory care over them; and lastly the yearly meetings, which include the whole society within a prescribed district, possess exclusively the legislative power, and annually investigate the condition of their subordinate meetings. In each preparative meeting there are usually two or more Friends of each sex chosen as overseers to take cognizance of any improper conduct of the members, to admonish them in love, and if necessary report the case to the preparative meeting. From this it generally goes to the monthly meeting, where a committee is appointed to endeavor to convince and reclaim the offender. The women have similar meetings and the like order and care for the help and preservation of their members, but take no part in the legislative proceedings of the society. There are also distinct meetings for the oversight and help of the ministry, composed of ministers and elders, the latter being prudent religious Friends chosen especially to have the care of the ministry. To monthly meetings belong the requisite care for the reception of persons into the society, the application for that purpose being first made to the overseers; also the granting of certificates of membership to Friends moving from their limits, the allowance and oversight of marriages, the free education of the children of the poor, and the maintenance of such members as are unable to support themselves.—When a member believes himself or herself divinely called to speak in the religious meetings of Friends as a minister, after a sufficient time has been allowed to make proof of the call, if the preparative meeting of ministers and elders unite in the judgment that a gift of gospel ministry has been committed to the individual, it so reports to the monthly meeting; and if this comes to a like decision, it forwards the case to the quarterly meeting of ministers and elders; and when it also unites in the conclusion of the others, the person is recorded as an approved minister.—The doctrines of the society may be briefly stated as follows, viz.: They believe in one God, the creator and upholder of all things; and in his Son, the Lord Jesus Christ, by whom are all things; and in the Holy Spirit which proceedeth from the Father and the Son: one God, blessed for ever. In treating of the Three that bear record in heaven, they prefer keeping to the language of Holy Scripture, which sometimes induced their opponents to accuse them of unsoundness. This was the case in the controversy which led to the writing of William Penn's "Sandy Foundation Shaken." He says the question between him and his opposer was, "whether we owned one Godhead subsisting in three distinct and separate persons." The latter words Penn argued against as unscriptural, but, to prevent a misconstruction of his views, says: "Mistake me not, we never have denied a Father, Word, and Spirit, which are one; but men's inventions;" and at different periods of his life he strenuously repelled the charge of Socinianism as regarded himself and the society. The same applies to his argument respecting the doctrine of Christ's satisfaction; for while he rejects the school terms in which his antagonist dressed it, he quotes numerous passages of Scripture proving that our Lord Jesus Christ, in his suffering and death, was a most acceptable sacrifice and propitiation for the sins of mankind. They own and believe in Jesus Christ, who was conceived of the Holy Ghost and born of the Virgin Mary, in whom we have redemption and pardon through his blood, even the remission of our sins; that he was a most satisfactory sacrifice for the sins of the world, being crucified without the gates of Jerusalem, rose from the dead the third day, ascended into heaven, and now sitteth at the right hand of God, our holy mediator, intercessor, and advocate with the Father. They have uniformly believed that he is true God and perfect man in wonderful union, and that the forgiveness of sins which any partake of is only by virtue of his sacrifice. That the Holy Spirit whom Christ said he would send, leads and guides his followers into all truth; that a manifestation of this Spirit is given to every man to profit withal, which convicts of sin, and, as it is obeyed, gives power to overcome and forsake it; that it enables savingly to understand the Holy Scriptures, and gives the livg experience of those things which belong the soul's salvation. Man was created in e image of God, capable of understanding nd obeying the divine law, and of holding ommunion with his Maker. Through trans- ression he fell and lost this heavenly state. is posterity come into the world in the image f the fallen earthly man, and until renewed y the regenerating power of Christ Jesus, they re dead to the spiritual life in which Adam riginally stood, and subject to the power of atan; and their imaginations, words, and deeds re evil. Man therefore in this state can know othing aright respecting God; his thoughts nd conceptions of spiritual things being un- rofitable, until he is renewed and quickened y the Holy Spirit. What was lost in Adam is ade up in Christ; and the guilt of Adam's in is not imputed to any until they make it heir own by transgression. There will be a esurrection of the righteous and the wicked, he one to eternal life and blessedness, the other o everlasting misery; and God will judge the orld by Christ Jesus. That the Holy Scrip- ures were written by divine inspiration, and ontain a declaration of all the fundamental octrines and principles relating to eternal life nd salvation; and that whatsoever doctrine or ractice is contrary to them, is to be rejected s false. The society does not call them the Word of God, this term being peculiarly ap- lied, in them, to the Lord Jesus; yet it be- ieves them to be the words of God, written y holy men as they were moved by the Holy Ghost, and that they are able to make wise unto salvation through faith which is in Christ Jesus. It looks upon them as the only fit out- ward judge and test in controversies among Christians, and is very willing that all its doctrines and practices should be tried by them, freely admitting that whatever any profess or do, pretending to be guided by the Spirit, which is contrary to the Scriptures, be condemned as a delusion. As there is one Lord and one faith, so there is one baptism, of which the water baptism of John was a figure. The baptism which saves the soul is not dipping in or sprinkling with water, but the answer of a good conscience toward God, by the resurrection of Jesus Christ. This answer of a good conscience can only be produced by the washing of regeneration and the renewing of the Holy Spirit, transforming the heart and bringing the will into conformity with the will of God. The communion of the body and blood of the Lord Jesus Christ is inward and spiritual, a real participation of his divine nature, through living faith in him and the power of the Holy Spirit, by which the soul is enabled daily to feed upon him and experience spiritual nourishment; the true Christian supper being that set forth in the book of Revelation: "Behold I stand at the door and knock; if any man hear my voice and open the door, I will come in to him, and will sup with him, and he with me."—Divine worship must be performed immediately between the soul and its Maker. No man can do it for another. It is therefore the practice of Friends to sit down in solemn silence to worship God, that each one may strive to gather inward to the gift of divine grace in order to receive ability to worship the Father of spirits in spirit and in truth, and offer to him, through Christ Jesus our holy Mediator, an acceptable sacrifice, whether in silent mental adoration, the public ministry of the gospel, or vocal prayer and thanksgiving. The call, authority, and qualification for gospel ministry are from Christ Jesus alone, who dispenses them to both men and women, as he sees fit, without regard to rank, learning, or human selection and appointment; and they must be received immediately from him through the revelation of his Spirit in the heart. The command, "Freely ye have received, freely give," is of lasting obligation, and the gospel is to be preached without price; hence the society has borne a constant testimony against a paid ministry, which derives its authority from human learning and ordination, which does not acknowledge a dependence for the performance of it upon the renewed motion and aid of the Holy Spirit. War is wholly at variance with the spirit of the gospel, which continually breathes peace on earth and good will to all men. When the reign of the Prince of Peace is set up in the hearts of men, "nation will not lift up sword against nation, nor will men learn war any more." The words of Christ, "Swear not at all," and of the apostle James, "Swear not, neither by heaven, nor earth, nor by any other oath," forbid all swearing of every kind. The fast to which Christians are called is not the observance of any particular day set apart by man, but a continual fasting from sin; and therefore Friends cannot conscientiously join in public fasts or holy days, so called. They hold that under the gospel there is no inherent holiness in one day more than another, but that all are to be kept holy; and they do not pay a superstitious reverence to the first day of the week, but as it is necessary some time should be fixed to meet to worship God, and that men should be free from outward affairs, and that laborers and beasts should have time for rest, and as the primitive Christians used the first day for these purposes, therefore Friends observe that day as a time of rest, and for religious retirement and waiting on God. The enslaving of the human species is entirely opposed to the commands of Christ and the spirit of his religion, and the society bears a testimony against the system; also against the unnecessary use of intoxicating drinks. It enjoins upon its members plainness and simplicity in dress, language, and behavior; moderation in the pursuit of business; and that they discountenance lotteries and games of chance, music, dancing, stage plays, horse races, and all other vain and pernicious amusements and practices.—In the year 1827 a separation took place in the society, in consequence of which some yearly meetings were organized as new and distinct associations. In a printed document issued at Philadelphia, dated 4th month, 21st, 1827, giving reasons for such separation, it is said: "Doctrines held by one part of the society, and which we believe to be sound and edifying, are pronounced by the other part to be unsound and spurious." These doctrines were opinions preached by Elias Hicks, and regarded as invalidating the miraculous conception, divinity, atonement, &c., of the Lord Jesus, and also the divine authority of the Holy Scriptures. Those who approved of E. Hicks and his sentiments were dissatisfied with opposition made to their promulgation and after the separation both parties maintained yearly meetings of their own, each still claiming the name of Friends.—See George Fox's "Journal," Sewell's "History," Barclay's "Apology," and Penn's "Rise and Progress" and "Key."

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* Under the title FRIENDS, a general view of the history and discipline of that denomination of Christians has been given; and this article, prepared under the authority of the Philadelphia yearly meeting, presents a more specific statement of their religious doctrines, as held by that portion of the body which claims to be the orthodox representative of its original founders.

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